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The Province of Alberta

**IN THE MATTER OF "THE NATURAL
GAS UTILITIES ACT"**

—and—

**IN THE MATTER OF an Enquiry into
Scheme to be adopted for Gathering,
Processing and Transmission of
Natural Gas in Turner Valley**

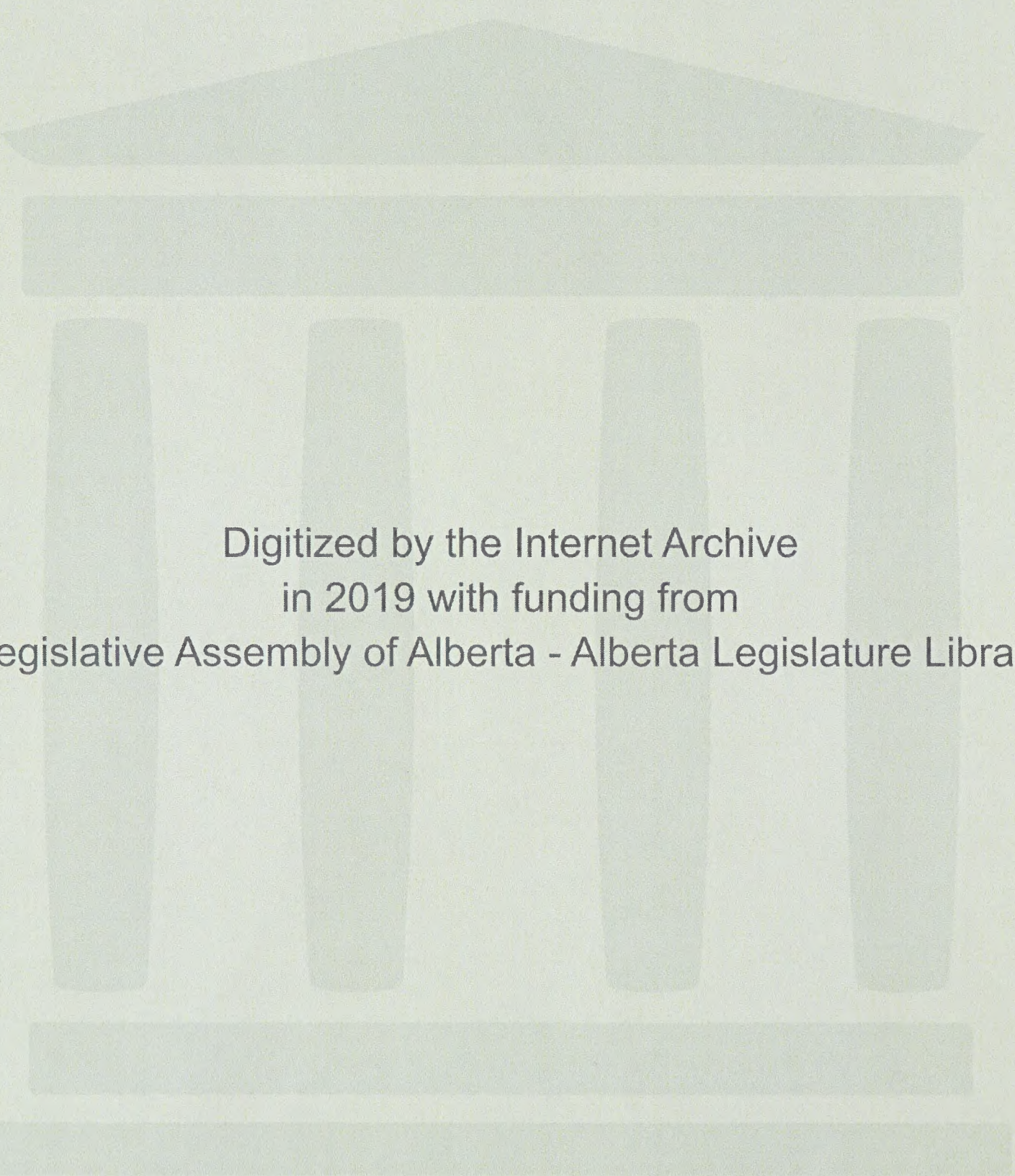
G. M. BLACKSTOCK, Esq., K.C., *Chairman*

Dr. E. H. BOOMER, F.C.I.C., *Commissioner*

Session:

CALGARY, Alberta March 4th, 1946

VOLUME 70



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I N D E X

VOLUME 70

March 4th, 1946

W I T N E S S E S

PAGE

GRAHAM RADCLIFFE McLELLAN (Sworn)

Direct Examination by Mr. Chambers	5742
Cross Examination by Mr. Harvie	5747

STANLEY J. DAVIES (Recalled)

Direct Examination by Mr. Fenerty	5749
Cross Examination by Mr. McDonald	5771
Cross Examination by Mr. Chambers	5797

E X H I B I T S

No.

PAGE

- | | | |
|-----|--|------|
| 153 | Statement Accounting treatment on books of Royalite Oil Company Limited, of expenditures incurred in Turner Valley in respect of Project "A" | 5743 |
| 154 | Tabulation of Coal Prices and comparisons of efficiencies of coal and gas, filed by S.J.Davies | 5750 |
| 155 | Page 556 from "Engineering Journal" dated July 1937, filed by S. J. Davies | 5761 |

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T-1-1 9.30

G. R. McLellan,
Dir. Exan.by Mr. Chambers.

- 5742 -

VOLUME 70.
March 4th, 1946.

MR. FENERTY: Shall we go ahead with Mr. Davies' evidence?

THE CHAIRMAN: Yes.

MR. FENERTY: Mr. Chambers wants to put in another witness, and as long as we get on today we do not mind. But we do not want to continue coming here. Now if you would step down for a moment.

THE CHAIRMAN: We will sit till one o'clock today but we will not be sitting on Wednesday.

MR. CHAMBERS: If the Board pleases, you remember I put in Exhibits 145, 150 and 151. They were certified copies of Orders of the Public Utility Board. I have had extra copies made which I am now distributing. Now I would like to call Mr. McLellan.

GRAHAM RADCLIFFE McLELLAN, having been duly sworn, examined by Mr. Chambers, testified as follows:-

Q Mr. McLellan, you are a chartered accountant?

A Yes sir.

Q A member of the Institute of Chartered Accountants of the Province of Alberta?

A Yes sir.

Q And employed with the Royalite Company Limited?

A Yes.

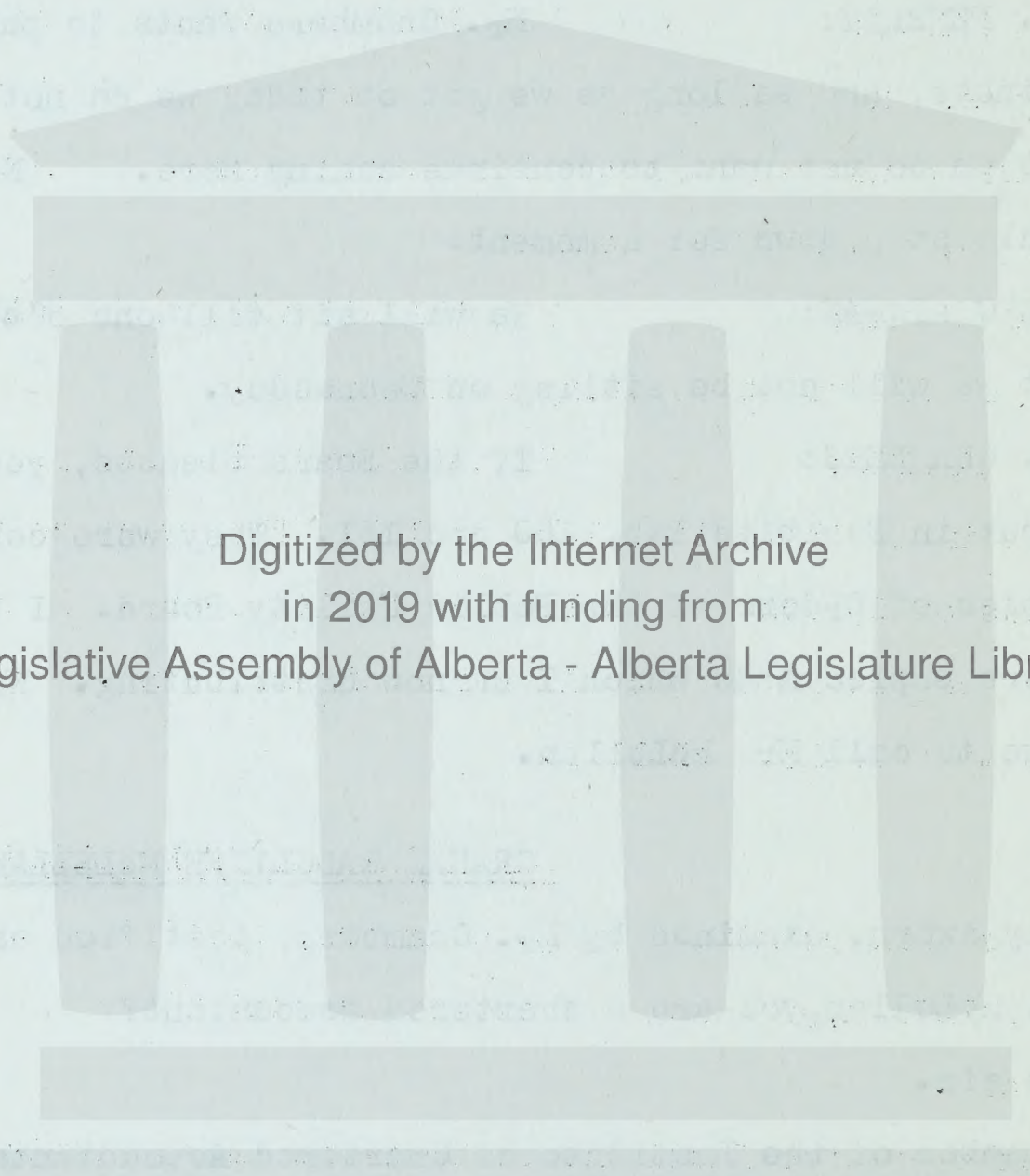
Q Since when?

A Since the 1st of January, 1944.

Q In what capacity are you employed?

A As Tax accountant.

Q You were present, I think, when Mr. Stevens-Guille gave evidence a day or two ago in connection with a piece of work



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G. R. McLellan,
Dir.Exam. by Mr.Chambers.

- 5743 -

done by Royalite Oil Company Limited known as Project "A"?

A I was.

Q And as I understand it you have prepared a statement giving the costs or the Royalite accounts with respect to Project "A", is that right?

A The manner in which they were handled on the books.

Q Have you got copies of those?

A Yes.

STATEMENT ACCOUNTING TREATMENT ON
BOOKS OF ROYALITE OIL COMPANY LIMITED
OF EXPENDITURES INCURRED IN TURNER
VALLEY IN RESPECT TO THE PROJECT KNOWN
AS PROJECT "A" NOW MARKED EXHIBIT 153.

Q Mr. McLellan, you might just read and explain to us your statement and make any comments on it as you see fit as you go along.

A It is headed Royalite Oil Company Limited, Accounting treatment on books of Royalite Oil Company, Limited, of expenditures incurred in Turner Valley in respect to the project known as Project "A".

Attached is a statement showing the total expenditures incurred on Project "A" and the distribution of such expenditures.

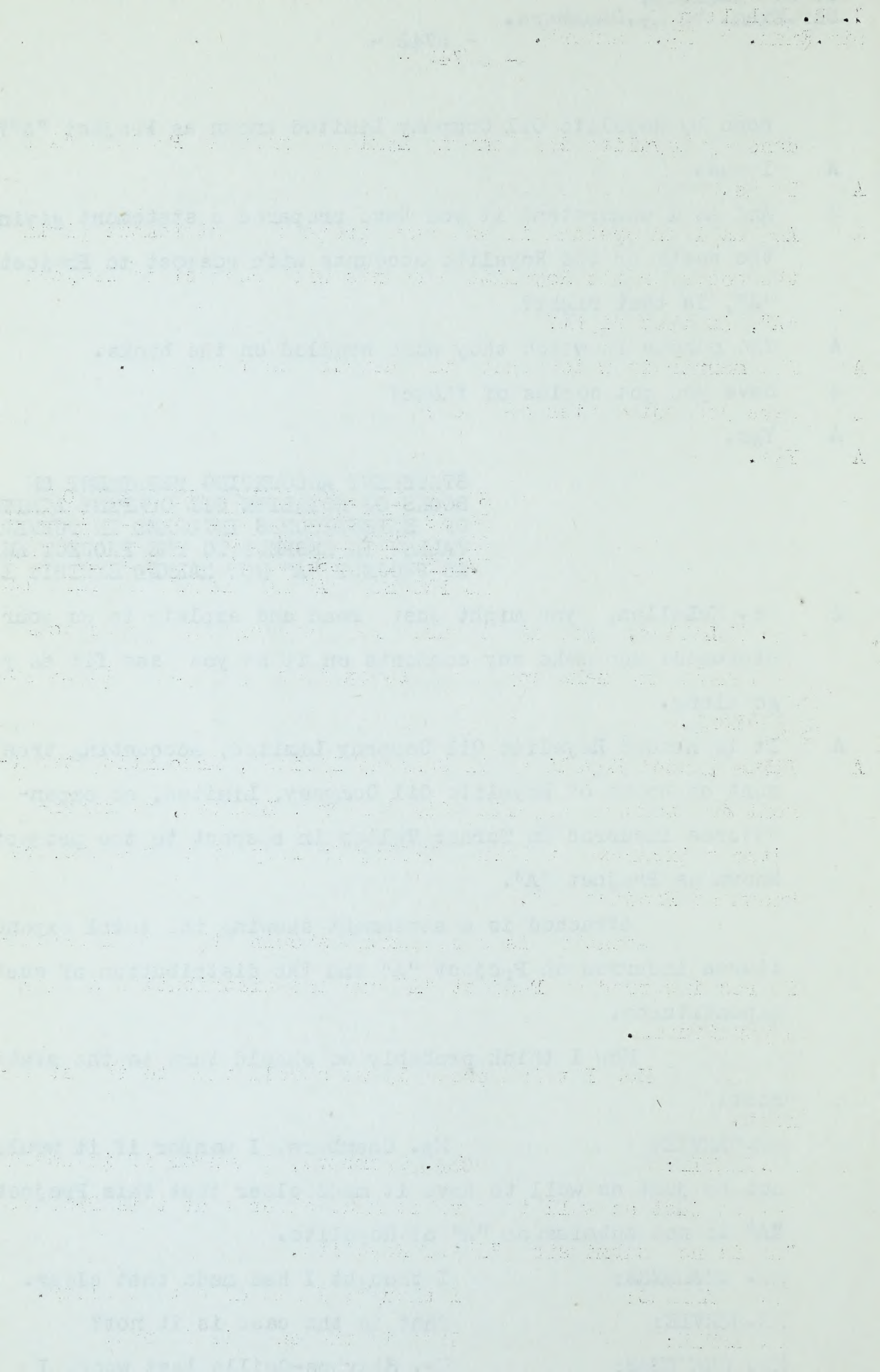
Now I think probably we should turn to the statement.

MR.HARVIE: Mr. Chambers, I wonder if it would not be just as well to have it made clear that this Project "A" is not submission "A" of Royalite.

MR. CHAMBERS: I thought I had made that clear.

MR.HARVIE: That is the case is it not?

MR. CHAMBERS: Mr. Stevens-Guille last week, I think it was, said around 1942 that Royalite had done certain work in Turner Valley, and that for the purposes



G. R. McLellan,
Dir. Exam. by Mr. Chambers.

- 5744 -

of convenience in the Royalite organization, the job had been referred to as Project "A". Project "A" has no official connection with any document that was put in here under that description.

MR. BLANCHARD: That was the installation that was discussed in Weymouth's Report.

MR. CHAMBERS. Some of them I think were. That is what Mr. Stevens-Guille described last week.

THE CHAIRMAN: And it is dealt with in an exhibit which is a contract between the Government and the Royalite and someone else.

MR. CHAMBERS: Exhibit 147 deals with Project "A" and deals with what was included in Turner Valley in the contract as well as what we claim was mentioned in the contract but not part of it.

THE COURT: That is just what you wanted to make clear?

MR. HARVIE: Yes, so that when reading the record later there should not be any misconception.

A Right at first there is an error on this statement, more of a typographical error, in Columns 7 and 9. That is the first word is "Charged" and it should read "Credited" in both cases.

Q MR. CHAMBERS: Columns 7 and 9?

A 7 and 9 both.

It will be noticed that the distribution is divided into three main classifications.

- (1) Expenditures incurred in respect to assets transferred to Madison Natural Gas Company Limited.

G. R. McLellan,
Dir. Exam. by Mr. Chambers.

- 5745 -

(2) Expenditures incurred in respect to assets not transferred to Madison Natural Gas Company Limited.

(3) Expenditures charged to expense.

Of the items charged and credited to Investment accounts in respect to assets transferred to Madison Natural Gas Company Limited and shown in columns (6) and (7) there are two which are not self-explanatory. They are shown opposite item (b) and amount to \$37,027.56 in column (6) and to \$23,727.40 in column (7). These amounts represent the net cost of certain changes required in the Boiler Plant together with the net book value of Boiler Plant equipment transferred from No. 2 Gasoline Plant when Gasoline Plant #2 was consolidated with the Gasoline Plant #1.

The amount of \$4,071.43 shown opposite item (f) in column (6) represents the cost to Royalite Oil Company, Limited of a dehydrator which was taken over by the Madison Natural Gas Company Limited.

At page 5325 of Volume 66, dated February 6th, 1946, Mr. Hamilton, the Board's auditor, has stated that the total out of pocket expenditures in respect to Project "A" amounted to \$639,582.02. It will be noticed that our figure representing out of pocket expenses, and shown on our statement of Total Expenditures, is \$642,747.49.

Q MR. CHAMBERS: That is Column 4?

A That is Column 4. A reconciliation of this difference follows;

Amount stated by Mr. Hamilton	\$639,582.02
-------------------------------	--------------

And then we have to add the equipment forming
part of cost of No. 2 Gasoline Plant
which was not transferred to No. 1

G.R. McLellan,
Dir. Exam. by Mr. Chambers.

- 5746 -

Gasoline Plant \$ 12,791.34

That gives us a sub-total of \$652,373.36.

From that we have to deduct secondhand material included by Mr. Hamilton in North Return Fuel Line costs \$9,630.52, and Secondhand material included by Mr. Hamilton in No. 3 Booster Station costs of \$30.00, a total of \$9,660.52, which deducted from our previous total gives us \$642,712.84.

Then we have an item for Workmen's Compensation Board forming part of No. 2 Gasoline Plant which was charged to No 2 Gasoline Plant expense, and was not taken up by Mr. Hamilton of \$34.65, making the total out of pocket expenses ditures as above \$642,747.49.

Now the statement itself, first of all gives us the secondhand material which came from other plants or probably part from the same plants in which the expense is shown. That is, it was taken out and put through our accounting procedure and back into the same plant. We have firstly the gross asset value of the secondhand material and reserve for depreciation which had accrued on our books, and the difference between those two is the net book value which then is added to the out of pocket expenditure, that is the actual cash moneys that were expended, giving us a total expenditure in Project "A" of \$684,550.04. Then Columns 6 to 10 inclusive give us the distribution of those total expenditures and as stated in the Report, these expenditures are divided into three classes. I think that is all I have.

Q Column 6, as I understand it, shows the portion of the \$684,550.04 which was the total cost of Project "A"?

A Yes.

Q Which was charged to investment in respect to the assets that were subsequently transferred to Madison, is that right?

G. R. McLellan,
Dir.Exam.by Mr. Chambers.
Cross-Exam.by Mr. Harvie. - 5747 -

A That is right.

Q And that total figure, the net figure is \$312,414.01?

A Yes, that is the assets less the reserve for depreciation that was taken over from other plants.

Q Less the book depreciation?

A Less the book depreciation, yes.

Q What about these items in Column 10, \$68,669.38? Am I right in this, that that is the portion of the total cost of Project "A" which in Royalite's books it had expensed and is not capital?

A That is charged to expense and not capitalized.

Q That is all. Will you answer any of my learned friends?

MR. STEER: I have no questions.

.....

CROSS/EXAMINATION BY MR.HARVIE;

Q Just one question, Mr. McLellan. On the statement you have just been referring to, Item 2, would you be good enough to tell me the basis on which you set up the reserve for depreciation on those items?

A Which Item 2 do you mean?

Q Column 2?

A Column 2? In most cases that would be 10% of the asset value taken on a yearly basis and accumulated to the date of transfer. I am not sure whether that is 10% in case of all assets, but I know that it is in most cases.

THE CHAIRMAN: Have you anything, Mr. Blanchard?

MR.BLANCHARD: I would like to have an opportunity, Mr.Chairman, of giving these figures a little consideration before I cross-examine. Possibly I will be able to go on tomorrow.

T-1-7

G.R. McLellan,
Cross-Exam. by Mr. Harvic.

- 5748 -

MR. CHAMBERS: Mr. McLellan will be available
tomorrow.

MR. BLANCHARD: Yes.

THE CHAIRMAN: That is all at the moment then,
Mr. McLellan, thank you.

(Go to page 5749).

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5749 -

STANLEY J. DAVIES, having been recalled,
Direct Examination by Mr. Fenerty, continued:

Q Mr. Davies, you were sworn originally and you are still under oath ?

A Yes.

MR. FENERTY: I think the Board and Counsel all have copies of the materials which we submitted.

THE CHAIRMAN: I got copies, Mr. Fenerty, but I could not find them this morning. I think I must have taken them back to Edmonton and I am wondering if I can have one copy more ?

MR. FENERTY: Certainly. We made a second bunch and I have an extra copy or two.

Q MR. FENERTY: Mr. Davies, I understand that you have done some research work in the prices of coal in Calgary ?

A Yes.

Q And have ascertained the prices of the various coals which you have incorporated in a statement ?

A That is correct, sir.

Q Will you tell us just what you did about that ?

A I went to various coal dealers, some in the retail business and some in the wholesale business, and asked them what prices they were selling coal at.

Q Yes ?

A And I wrote them down and tabulated them in this sheet of coal prices.

Q Did you make enquiries as to whether the coals which you included in your statement were available ?

A They are. You will have to see the Coal Controller but he gives you permission. There is no refusal. There is more

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5750 -

coal for sale now than there is a market for.

Q Yes, and now you have before you a tabulation of those prices ?

A Yes.

Q And attached to that I believe you have a series of examples or illustrations of the results in the use of gas and coal, using gas and coal at various efficiencies and based on the prices of coal as included in, or as indicated by your statement ?

A That is right, sir.

MR. FENERTY: I think we might as well include this all as one statement and perhaps I had better ask to put them in now so I will not forget them.

DOCUMENTS OF TABULATION PRODUCED
HERE MARKED AS EXHIBIT 154.

Q MR. FENERTY: Now are there any items on this statement which you think require any explanation, Mr. Davies, so that the Board and all Counsel will understand how it is made up ?

A I have listed the cost of coal under a number of columns. There is the carload lot price at the mine, freight to Calgary and the local cost of delivery. The cost of crushing where powdered coal is used and carrying down that column you will note it is particularly applicable to Canmore coal. The dealers' charges and then the cost to the consumer in the final column.

Now I find a variety of prices on the coal. The dealer who buys coal and sells it in one ton lots and half ton lots receives a price that varies from two dollars to two dollars and a half a ton and for the carload price, the customer who wishes to buy a carload lot may do so and he unloads it and delivers it himself and I have added to the costs of delivery on the carload lot what is

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5751 -

applicable, fifty cents in one case and fifty-five cents a ton in another, in most cases it is fifty cents a ton in carload lots.

And then I have one listed that I did not put on this because it applies to so few but it is an important one and that is the Calgary School Board that can get prices still lower than these. However I did indicate in a couple of examples the coal prices paid by the School Board in the year 1945 and in two examples which I give, as to efficiencies.

Q Now Mr. Davies, the second group of prices on this list, the first is Taber and there is Lethbridge ?

A Yes.

Q And I think they should be cleared up, my understanding is that those prices are for Lethbridge coal in Lethbridge ?

A That is right.

Q And with those exceptions the prices you have given are the prices of coal in Calgary ?

A In Calgary.

Q That really should have been marked, the second one is from Lethbridge, and it is the price of coal in Lethbridge and the rest in Calgary ?

A That is right, sir.

Q MR. CHAMBERS: What about Taber ?

A Taber is the same.

Q Is that in Taber ?

A That is in Taber and if you have it shipped out from Taber to some other point you have to add another series of calculations on it but it applies to so few that I did not complete it out but it is a factor as to gas, as Taber is on

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5752 -

the line.

Q MR. FENERTY: And then Drumheller, Canmore, Priddis and Crows Nest mines, those are prices in Calgary ?

A That is right.

Q And then turning to the second last page in the set of examples, referring to Lethbridge, that is also as I understand it, based on the Lethbridge operations ?

A That is right.

Q Or in Lethbridge ?

A That is right, sold in Lethbridge.

Q Now coming to these tables, I note that you have worked out various examples with different efficiencies and the first one for instance, Drumheller coal, you have taken the gas efficiency 75% and the coal efficiency 75%, and with examples you have taken the same efficiencies but with different percents, and others again different efficiencies with different percents ?

A Yes.

Q As I understand it these are by way of illustration of the results that occur with different efficiencies, due either to the inherent qualities of the coal or the equipment used ?

A I took a number of calculations.

It is not so much on the basis that they are applicable to all customers in Calgary because they are not, but to illustrate certain customers which I have had the opportunity of investigating. There are some twenty-seven thousand customers in Calgary, sir, and they have all different conditions under which, - they used coal in the first place and they now use gas and it is like twenty-seven thousand different individuals, they have their likes

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5753 -

and dislikes and in using the coal they arrive at different results so in order to understand this problem at all, and I am not by any means through investigating it, I started with a very efficient gas burning plant and I worked down to a very inefficient equipment in a domestic home.

Through it all we find in general this, and perhaps a word of explanation as to how you go out to adjust the efficiencies might be in order.

Q I would like you to discuss this question of efficiencies now at some length, your studies of it and your illustrations.

A In the first place, sir, in burning natural gas, there are two products of combustion, one is steam, the other is carbon dioxide. In this locality and at this pressure, at this pressure and temperature about 400 cubic feet of natural gas is equivalent in weight to sixteen pounds of gas. It is given at 386 under standard conditions of pressure and temperature but we need thirteen and a quarter pounds here and in the case of the Gas Company equipment a lot of the gas is burned at 65 degrees, the temperature in the basement in a man's house, or thereabouts, around 65 degrees.

Now if we take sixteen pounds and change it into, by combustion into steam and into carbon dioxide, we find that a thousand cubic feet of gas burning in the City of Calgary will give us approximately 90 pounds of steam. Now 90 pounds of steam going off into the air carries with it latent heat, the vaporization, and the heat it requires to heat it we will say to a temperature of from 400 to 600 degrees fahrenheit, if the stack temperature was by any chance below 212 degrees, it condenses the moisture and you would have a wet chimney and damage to your house, so this

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5754 -

steam goes off into the air carrying with it heat and if you take it on the basis of 90 pounds of steam and 1100 B.t.u.'s carried off with each pound of steam because 96% of it will be latent heat in the steam, we arrive at something like ninety times eleven hundred which would be 99,000, which is roughly 10% of the heat units that are in the natural gas.

Now I give that as a rough calculation on the record but it can be taken from any chemical engineer's handbook where it is set out in great detail and they arrive at roughly the same figure 10%.

Now so much for the steam going off into the air.

Q MR. FENERTY: That is roughly 10% ?

A Roughly 10%.

Q Yes.

A And so then we have the CO₂ and for the same 400 cubic feet we find we have some 44 pounds of CO₂ in 400 cubic feet of natural gas and in a thousand cubic feet gives us 110 pounds approximately of carbon dioxide. Now when that is heated and likewise goes off with the temperature, the stack temperature of from 400 to 600 degrees, we get a further loss in heating units that are carried off to the air and we just cannot do anything about it, because we must get the steam out and we must get the CO₂ out into the atmosphere, so we have another approximately 5% loss in that plant.

Along with or included in this 5% is the fact that in order to get the oxygen to consume, to combine with the carbon and the hydrogen, it was necessary to have four times as much nitrogen, which is roughly one-fifth oxygen and four-fifths nitrogen in the air so we have to heat

C-1-7

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5755 -

up this inner nitrogen, which went to the fire box and up the chimney and we get no benefit of the heating units that the nitrogen carried off into the air.

(Go to Page 5756)

M-1-1 - 10.05 A.M.

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5756 -

So in natural gas burning equipment due to the quantity of hydrogen and what is generally termed hydrogen losses, 85% may be considered a maximum efficiency that can be secured with gas burning equipment.

Q Now as I understand you that 85% would be the maximum in what we would call a perfect operation ?

A That is correct.

Q Is there any such thing as an actual perfect operation ?

A No, there is not. The best equipment that I can find in the City of Calgary is over at the Calgary General Hospital. It is new equipment, put in in 1942 and there is a very excellent man in charge and they have all of the equipment there necessary to calculate efficiency. They are very much interested in the matter and I have been inside one of the boilers and it is clean as can be. They really make a study of this question of efficiency. Now I have calculated it with that on their data, the efficiencies they found in the plant and I find it runs just under 80%. I have seen other figures by manufacturers who gave efficiencies of about $78\frac{1}{2}\%$. I think that would be right. That is in an industrial installation with every modern piece of equipment to check the combustion, control of air, control of stoker, temperatures and full sets of recording instruments.

Now the reason a plant such as the General Hospital can get 80% is because this cold air is controlled, going through the fire box and it is in this control of the amount of air going through the fire box that we have our principal defect in the burning of natural gas in the ordinary household appliance. What happens in a plant such as the Calgary General Hospital is that they have men stationed in

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5757 -

the plant who have control on the stack temperatures and the amount of cold air going in the fire box. They control it by watching a C.O.2 recorder which gives the percentage of carbon dioxide in the air. Now if there is not enough air carbon monoxide would form and that is a very poisonous gas, so that every individual in a house does not dare take a chance of carbon monoxide forming. That is the principal cause of our deaths in houses which have gas burning equipment, so they provide an excess of air. Now when a cold day comes there must be chimneys of such size, flues of such size, and a fire box capable of turning on the gas full and still not have carbon monoxide formed and the sufficient volume to take away the flue gases, so they go up the chimney. Now when a man, his wife or member of his family turns down the gas, that still has the same space in which to take cold air through and there is not any person available to limit the outlet of the flue as we have in the Calgary General Hospital, the result is that we are always driving excess cold air through the fire box and we lower our efficiency. Now how much? Well it is obvious that the figure given I think by Mr. Zinder was 75% in commercial plants. Now I would consider that to be a maximum in the most up to date plant, any commercial plant that I know of and I would think that efficiencies from what I have seen go down to 50%. When you come to houses, Mr. Zinder gave 70%. Well I have had some experience of houses and I have a gas Basmoor gas fired boiler in my own house and the best that I can calculate my efficiency of in burning gas is around 60%. I am quite satisfied that there are very few installations in Calgary that are 70% in domestic installations. I want to illustrate that. I have a thermostat on my furnace and when

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5758 -

the temperature reaches a certain 72 degrees in one of the upper rooms, the furnace is turned on by the thermostat. The fire goes on with a bang and of course the cold air starts to be pulled in by the furnace and up the flue and it goes on for a few minutes and off it goes, but in the meantime, the cold air keeps on going out and does two things. It cools the hot water apparatus that I use heating in the furnace itself and carries heat off up the chimney because I just do not trust to any automatic arrangement to regulate the temperature in the pipes, so when the thermostat goes off it closes off that gas but my pilot light does not go out and if I was to close the damper and my pilot light went out my basement would be filled with gas and I would have another fire in there and presently my house would disappear along with my family. So I do not take the chance and I do not suggest that any other householder do take the chance and we have sufficient flue capacity so when the gas - the pilot light goes off, the gas goes right on up the chimney. We do it as a safety measure as much as anything with the net result that we do not have any 70% efficiency but we do have 60%.

Now in coming to some of these calculations. Where I put 75% efficiency in both cases I might as well put 25 as well, because they just cancel out in the calculation and I just put in there not to show that either gas or coal had 75% efficiency but to show in the calculations where the two balance off. And what happens if there is equal efficiency. Drumheller stoker coal....

2 Mr. Davies, just before you come to that. You have told us now about a theoretical efficiency of 85% and a practicable

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5759 -

maximum efficiency you are satisfied in Calgary of 78. something.

A That is for industrial installations.

Q Now then I want you to compare the theoretical maximum efficiency of 80% for an industrial installation operation with a maximum actual efficiency for an equal efficiency of coal operation in industrial ?

A Well the C. P. R. are going to build a new plant in Calgary and incidentally the C. P. R. western fuel engineer is a most excellent man. He built a plant in Transcona, in Winnipeg. It is in Winnipeg, in the C. P. R. shops which shows an efficiency of slightly over 80% utilizing bug dust. Now bug dust is a name which has been given to this dust they pick up around the coal tipple and apparently it is a very fine place for beetles to nest in there, to live in. And some wit, of which we have many in Western Canada, gave it the name of bug dust, but it is extremely fine material and you would think it would be absolutely useless, but he burns that in the shops in Winnipeg and gets an efficiency of slightly over 80% and it is based on that information.

Q You are referring to the plant described in the Albertan ?

A Yes, that they propose to build this plant at the Alyth shops for the purpose of heating the engines up before they go out on their runs, so they have not got that long period of poor combustion and with the oil burners while the engine is cold.

MR. CHAMBERS: Is the witness' information now based on what is in the Albertan ?

A No, I just said that the plant in part was based on it, that is the intention of the C. P. R. was to build a plant here.

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5760 -

The plant in Winnipeg is an actual plant. That is not in the Albertan, by the way I do not think.

Q MR. FENERTY: Yes, the one here is not built.

MR. CHAMBERS: No, but what I was getting at is the C. P. R., as to whether or not they are going to build, is a matter of information from the Albertan.

Q MR. FENERTY: Oh yes, just information. Now somewhere in this material my recollection is I have seen an efficiency as high as 91% in a steam plant ?

A It was in the Research Council of Alberta Bulletin 35 and if I may have that. I think I had better correct that. It is 89 in here, page 60, top of page 60, efficiencies as high as 80% are shown with domestic coal, sub-bituminous (b) and stoker fired furnace and as high as 89% with steam coal in a pulverized coal fired furnace. Perhaps I should add to this that in an industrial plant utilizing coal because there is not so much hydrogen in the fuel you can go to an efficiency of close to 90% and the normal efficiencies utilizing Lethbridge, Drumheller and Edmonton coals as long ago as ten years ago, were then in the neighbourhood of 80%.

(Go to Page 5761)

T-2-1 10.20 a.m.

Stanley J. Davics,
Dir. Exam. by Mr. Fenerty.

- 5761 -

A Now may I have that publication, Mr. Fenerty?

Q This one?

A That is right, sir. Mr. Denton put it in. It has already been put in, a sheet given from Professor Robb's article written in July 1937, nine years ago. The number of efficiencies on various power plants and what they were using.

Q Yes, I would like you just to comment on that. I may say in view of the fact that Mr. Denton's Report was being withdrawn for convenience I took this copy or this page out of that. Mr. Davics has the original article there as well.

A I am indebted to Mr. Langston for this copy of the Canadian Journal.

Q I would like you to put in some of those efficiencies.

A Moose Jaw 81% using powdered coal. Sentinel, that is in the Crow, 80% using powdered coal; Saskatoon 72% utilizing Drumheller coal, and that notation was to the effect that the City of Saskatoon was using Drumheller coal and is from Page 559 of the July 1937 bulletin, Engineering Journal. Lethbridge using Lethbridge coal 78%. Edmonton using Edmonton coal 76%, and the City of Calgary utilizing gas, 69%.

MR. STEER: Are you going to put that in?

MR. FENERTY: I think perhaps we will tender this.

STATEMENT NOW MARKED EXHIBIT 155.

MR. HARVIE: Give me please what Exhibit 155 is again?

A It is a page out of the Engineering Journal, Page 556, of July 1937, giving the details of the burning of low rank Alberta coal, steam generated plants, by Professor Robb of the University of Alberta, now with the Aluminum Company of Canada.

MR. STEER: Now back with the University.

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5762 -

A Is he? He is a very fine fellow.

Q MR. FENERTY: We have been discussing maximums. Is my understanding correct that both in the case of gas and coal that you can have a very substantial difference, less efficiency down the line for how far?

A In the ordinary household such as we had in Calgary in 1925, with coal you would go as low as 40% or 50%.

Q How much?

A 40%.

Q Are you in a position to say about how low gas can go?

A 35% in an ordinary kitchen range. In fact the old ranges did not give you any much hope of getting more than 35% and some of them are still in use in Calgary. I do not want by that to mean that gas-burning appliances were all lower than 35%, because I do not think they were, but in general we have in Calgary gas being burned in coal-burning appliances, fire boxes too big, flues too great and proper regulation of air quite impossible, and efficiency with the average household using gas is low, I would think about between 50 and 55% in that territory.

Q Now, Mr. Davies, having in mind all you have told us, and the inquiries you have made and the opinions you have formed, I understand the efficiency will vary with the manner of handling the equipment and the equipment and so on. But are you in a position to venture an opinion as to the relative average efficiency which you think would be fair both to coal and gas under conditions in Calgary?

A Well I took the School Board data for two identical schools, sir, one fired with natural gas and one fired with a stoker, using coal. I find the efficiencies of those two are about equal. There is not 1% difference.

Stanley J. Davics,
Dir. Exam. by Mr. Fenerty.

-5763 -

Q What would you say for the average efficiency under all conditions, how would they compare?

A I would think that the modern coal equipment, that is the stokers, compared to the present gas equipment, the efficiencies are about equal domestically and in commercial installations, and I have already dealt with the fact that in industrial installations coal can have a higher efficiency than gas-burning equipment.

Q All right. Then coming to these illustrations, is there anything you think should be explained about it. Perhaps you would just explain one illustration so we can see how it works?

A If we take the very first one, Drumheller stoker coal is made use of by the School Board. By the way, when they do use stoker coal from Drumheller they mix a certain quantity of slack in with it, and so reduce the price. 9850, under Column 1 on Page 1, is the B.T.U. content. The 1000 underneath it is the B.T.U. content in a cubic foot of gas. If you say the efficiencies are the same, these two will cancel out. 2000 lbs. in a ton and 1000 cubic feet, multiplying the denominator, and the equivalent there is 19.7. That calculation works out to 19.7. What that virtually shows is that 19.7 M.C.F. of gas is equivalent to 1 ton of coal. 19.7 M.C.F. costs \$4.00 a ton delivered; the equivalent price for natural gas would have to be 20.2 cents. I give you that example as an illustration of what someone with modern equipment in a commercial installation can do in the way of prices. Now slack coal which is used in a large plant like Burns; the Burns plant needs rebuilding. That \$2.30 is made up of \$1.30 freight and \$1.00 cost at mine. Now coal can be bought for less than \$1.00 a ton, slack coal. That is just

Stanley J. Davies,
Dir. Enal. by Mr. Fenerty.

- 5764 -

giving equal efficiencies with a big plant like Burns, without stressing the fact that it might have a higher coal efficiency, shows you that the price has to be down low for natural gas or else it is cheaper to burn coal. I may point out here that it does not take any more manpower for storage. Burns already has a stand-by carrying coal storage, and the rest of it right there all the time. The money is already invested. By the way that is also true of the Calgary General Hospital. They have an oil stand-by and money invested in the equipment standing right there at all times.

Q Now, Mr. Davies, I am not going to go over any more of these illustrations, but I want you to briefly turn now to Lethbridge coal on the second last page. I note there that you have only carried your illustration to the point of domestic use. Would you tell us just why that is?

A Well, in Lethbridge the industries, the power plant for instance, are already on coal. There is no use talking about that one. The bulk of the commercial buildings are already burning coal and there is not any discussion on the matter there, because gas just is not able to compete with coal at those prices in Lethbridge right now.

Q You think that is the best way of illustrating that situation?

A I do not think there is any discussion on that. They are burning coal.

Q So much for that. With reference to the general trend, Mr. Davies, and coal competition. You referred me some time ago to an article, and I would like you to give the rest of us the benefit of the expressions of opinion there. First of all tell us what this article is?

A This is an article commencing on Page 158 of the January issue of "The Petroleum Engineer", by G.G. Oberfell, who is the

Stanley J. Davies,
Dir.Exam.by Mr.Fenerty.

- 5765 -

Vice-president in charge of research and development for the Phillips Petroleum Company. Mr. Oberfell was the.....

Q I am interested in the petroleum industry's point of view. Would you turn to those particular parts you have marked there 1, 2, 3 and 4, dealing with coal competition, and give us it?

A Mr. Oberfell was the prime mover in the bottled gas industry, and a very famous man, and by the way he has written this article and given a summary for the year 1945, summarizing gas, bottled gas and coal, and I very respectfully bring it to your attention, sir. On Page 166, he states:

" However, gas will have competition for the expanded domestic load with the chief competitor in the fields of domestic refrigeration, cooking and water-heating continuing to be electricity."

He goes on:

" It is also expected that the use of coal and fuel oil for general house heating in well-designed and efficient equipment, operating with a new high standard of cleanliness will show a decided increase and may ultimately erase the trend towards the use of gas for this purpose."

And (3):

" From the more distant viewpoint, however, the extension of natural gas use does not appear probable in those applications where the cost per heat unit is the prime factor."

Q Now then.....

A I would say that the experience with large plants here in

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5766 -

this territory, that is definitely the case, where the cost of coal is low and where they have them in there anyway, coal is the fuel used.

Q Now, Mr. Davies, in Volume 66, page 5302, Mr. Brownie gave us some figures in answer to questions put to him. Would you look at that? I want you to get some notes that you made based on those figures?

A May I, before I read these figures, give the number of houses which have been constructed in the past few years, because it has a bearing on the figures Mr. Brownie gave. The list from which I now read is a list of houses completed in the City of Calgary. 1932, 141; 1933, 77; 1934, 68; 1935, 28; 1936, 27; 1937, 19; 1938, 20; 1939, 55; 1940, 99; 1941, 290; 1942, 436; 1943, 274; 1944, 687; and 1945, 1192.

It is necessary, sir, to have those figures before these become intelligible. Mr. Brownie gave these figures at the bottom of Page 5302, domestic sales in the year 1939. He also gives domestic sales for the year 1944. In both cases he gave the revenue. Do you want me to read it, sir?

Q Yes, perhaps you had better give the figures now so that we can follow what your deductions are.

A 3.7 billion cubic feet was the domestic consumption in 1939, and the revenue was one million, two hundred and seventy-two thousand odd dollars. In 1944, the domestic sales were 4.5 billion, and the revenue was \$1,301,000.00.

(Go to page - 5767).

C-2-1 - 10.40 A.M.

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5767 -

Now the first, 1939, the price was over 33 cents. The scale was 33 cents but there^{are}/always those that do not pay their accounts on time so that puts the average up.

In the second case in 1944 it was 28.2 cents, the average price of domestic.

Now I want to point out that part of the figure for 1944 will arise from some 92%, or the percent given by Mr. Brownie of these new houses which were built from 1939 to the end of 1943 and a part of those built in 1944.

Now if we were to put prices back to where they were in 1939 it is my opinion that the same number of houses, given the same customers, would have burned approximately the same amount of gas, no more and no less, no more and no less.

Q MR. McDONALD: "The same number of houses" would all refer to the same number, is there not a difference somewhere ?

A The same as 1939, perhaps you did not catch what I said.

Q No.

A If you put the price back to where it was in 1939 the same number of houses as there were in 1939, those same houses would burn the same quantity of gas that they burned in 1939 provided the temperature conditions were the same.

Now we accept the view that this is a saturated market. That you cannot get very many more customers at present prices; that you are just saturated so far as sales of gas are concerned. That being so/^{when} you start backing up on the cycle of increasing prices you are in the vulnerable position you could be to begin to lose business because you already start with a saturated market.

Now it is our view the place you start to

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty

- 5768 -

lose customers first would be commercial installations utilizing new coal equipment which was not in existence in 1939, but which has been devised or adapted from equipment in large industrial plants which were shown to be very efficient. Now they have got small sizes which will go into a building, for instance.

Now I think we agree that the domestic consumer is going to burn gas but the quantity that he burns will I think be in accordance with the fact as pointed out by Mr. Brownie here, depending upon the price, that is the quantity he burns is related to the price.

When it comes to industrial plants, large industrial plants, I am of the opinion that we will probably lose part of the Imperial Oil Refinery market and that even at present prices for gas, other factors will cause us to lose some of this industrial market which we gained since 1939. Again referring you to Mr. Brownie's statement at the bottom of Page 5302, and I just want to bring to your attention the most marked expansion of domestic, or rather of commercial and industrial sales that took place during the war years. In 1939 commercial sales were 2.1 billion; in 1944 they were 3.9 billion;

In 1939 industrial sales were 1 billion and in 1944 they were 2.4 billion.

Now sir, that is the vulnerable part if you want to put it in that term, of our market situation here because it is the portion where coal burning equipment is in fact now in operation in Lethbridge for instance and with an increase in rate could be brought into place here, undoubtedly.

Now I want to say something here, sir,

1. The first part of the paper discusses the importance of understanding the underlying mechanisms of the observed phenomena. This is crucial for developing effective interventions and policies. The authors argue that a comprehensive understanding of the system is necessary to address the complex challenges it presents.

2. The second part of the paper focuses on the methodology used in the study. The authors describe the data collection process, the statistical models employed, and the validation techniques used to ensure the reliability of the results. They emphasize the importance of transparency and reproducibility in scientific research.

3. The third part of the paper presents the results of the study. The authors show that the proposed model accurately predicts the observed outcomes across different scenarios. They also discuss the limitations of the study and the need for further research to refine the model and explore new aspects of the system.

4. The final part of the paper discusses the implications of the findings for practice and policy. The authors suggest that the insights gained from this study can be used to inform decision-making and to develop more effective strategies for addressing the challenges at hand. They conclude by highlighting the need for continued collaboration and research in this field.

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5769 -

that is just a recorded fact but I have been connected with this question of rates now for some twenty years, representing the same people throughout, and in co-operation with the Gas Company we have successively lowered rates and in the last few years, the 1939 schedule and the 1945 schedule, I was not here for the 1943 reduction, but I want to mention that in a moment.

With this 1939 there was a substantial change in rates, and the question of competition from coal was a factor in setting the type of rate or rates that were put in in the City of Calgary, in order to enable the Gas Company to get all the business - -

Q THE CHAIRMAN: Just classifications ?

A Yes, right, sir, and when in 1945 this new rate was put in, No. 6, it was so designed to keep as many of the industrial consumers as we possibly could because they can go elsewhere.

Now one thing more about the 1943 reduction in rates; about that same period the light fractions were taken out of the gas by this plant we heard about during the last few days and it lowered the heating content of the gas because the light fractions were taken out of it.

Q THE CHAIRMAN: And which were those ?

A The butanes, the iso-butanes and propanes which were normally left in the gas up to that time and so we have now the sale of a gas around a thousand B.t.u.'s, where previous to the putting in of the plant which took out the light fractions, the heating content per cubic foot of the gas was in the neighbourhood of 1050 B.t.u.'s, so that the reduction in the rate in 1943 was most proper from the point of view of the heating content of the gas.

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.

- 5770 -

THE CHAIRMAN: Although I do not think that had much if anything to do with it.

MR. CHAMBERS: I was just wondering whether that was the reason it was made.

Q MR. FENERTY: Now do you think you have covered the contents of this pretty well ?

A Apparently I have not covered it very successfully.

Q That is still a matter of opinion. Now there is one other thing I want to ask Mr. Davies and it has actually nothing to do with competitive fuels but you will remember and I think it is a good time to do it, you will remember I asked one witness if he had heard about these changes in taxes and Mr. Davies has been in the Gas business himself and has knowledge and I thought I might have the affirmative evidence now.

THE CHAIRMAN: All right.

Q MR. FENERTY: There was some discussion about the recent changes in connection with relation to Sales Tax and War Taxes and the taking off of the duty, do you know of those, Mr. Davies ?

A Yes.

Q Will you tell us about that ?

A A very confusing situation has arisen but the War Tax of 10% and one half percent of the Foreign Exchange is off, making $10\frac{1}{2}\%$; that apparently is off all items purchased from the United States. Now compressors do get the 8% Sales Tax and we think the duty, if they did not already get half the duty before, they get it now, some do; some items, like pipe, got half the duty back before and do not get the Sales Tax off now; some items get half the duty off and the Sales Tax, but not

Stanley J. Davies,
Dir. Exam. by Mr. Fenerty.
Cross-Exam. by Mr. McDonald.

- 5771 -

all, and if you are revaluing the Madison assets now, it would make a very substantial difference in price.

Q THE CHAIRMAN: That is on a reconstruction new basis?

A That is right.

Q MR. HARVIE: Upward or downward?

A At the moment down. There will be another one up, I will not say how far up, but up a little distance, when the new price of steel is announced, but I might say that some of these reductions amount to a total of $12\frac{1}{2}\%$ plus 8% plus $11\frac{1}{2}\%$ on top of that again, so they are very substantial reductions in some cases.

THE CHAIRMAN: I think we might as well take our adjournment now.

(A short adjournment was here taken).

(After the adjournment).

MR. FENERTY: And that is all I wish to ask.

THE CHAIRMAN: Mr. Steer?

MR. STEER: No questions.

THE CHAIRMAN: Mr. Chambers?

MR. CHAMBERS: I thought Mr. McDonald was going to go first.

THE CHAIRMAN: That is quite all right, Mr. McDonald.

.....

CROSS-EXAMINATION BY MR. McDONALD.

Q Mr. Davies, you obtained your information regarding the prices at Calgary through inquiries from dealers?

A That is right, sir.

Q Well now, I notice that when you get down to stoker and slack coal in your statement, you do not refer to the dealer's

Stanley J. Davics,
Cross-Exam. by Mr. McDonald.

- 5772 -

charge, in your Exhibit 154?

A Where is that, Mr. McDonald?

Q In the Drumheller?

A In the Drumheller.

Q Stoker and slack?

A And slack, no, that is right.

Q There is no cost of delivery regarding slack.

A No. That is a question of places like Burns, where a carload of slack comes directly into Burns and they are unloaded mechanically, and I am informed that it costs them only a cent or two a ton to unload.

Q Yes. Now that is taking, - that would only be so on maybe one or two installations?

A That is industrial, in large industrial.

Q That also presupposes a siding?

A That is right.

Q And presupposes a raised ramp on which the cars will be run?

A No, not necessarily. They have these coal unloaders. They are a little affair something like a cathead in a rotary rig and a little scoop that just pulls the coal out about as fast as a man can pull it.

Q However there would be some expense in that, you would have to make the investment in such an instrument?

A Well I have left, you see there is the difference between 80 cents and a dollar in there, I put \$2.30 over on the right hand column, well 80 cents and \$1.30 freight is \$2.10.

Q Now do you know of any sales of slack at 80 cents?

A I have been informed that very large contracts are available right now at, some 20,000 tons, at 80 cents.

Q And that is slack which has been accumulated over many years?

Stanley J. Davics,
Cross-Exam. by Mr. McDonald.

- 5773 -

A No, this is slack currently being produced in Drumheller. The slack comes or accumulates in the wintertime as they produce the coal.

Q THE CHAIRMAN: Just what is slack?

A Fine coal that will go through a quarter inch screen, sir.

Q And it gets into that condition in the mining process?

A That is right, and the more machine mining they do in certain seams the more fine they get, ^{and} anything which helps to use up the fine coal enables the miner to get a higher average price per ton.

Q MR. McDONALD: Now what about storage of slack, will it store?

A Oh, some will and some will not.

Q Yes, and it is subject to spontaneous combustion?

A A large pile at Drumheller of the more lignite type is subject to spontaneous combustion, providing they do not keep water on it. The railways pump water on it and that of course, keeps the temperature down.

Q Another thing about it, it is subject to, it cannot be stored and it would have to be shipped in the winter time, and it would have to be shipped as used.

A I did not say it could not be stored. I said you had to pump water on it if you are going to store it in the summer time.

Q Is there difficulty in unloading that type of coal from a car?

A If it is frozen, yes, but what is done now, and you will see it on Exhibit 154, across there, in the Crow's Nest, "Car lot treated CaCl. That prevents that.

M-2-1 - 11.20 A. M.

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5774 -

Q Does that increase the cost ?

A The cost is given in there. You see it is a few cents a pound but it is included in those prices. I think thirteen cents a ton or thereabouts.

Q What about shrinkage of coal in carload lots ? There is shrinkage between the mine measure and the delivered measure. Who absorbs that usually ?

A Well in Calgary the dealer absorbs it. That is where his \$2.00 comes in. You buy a ton of coal in Calgary, the dealer gets \$2.00 on it. He absorbs the shrinkage. When you buy a carload lot the purchaser absorbs the shrinkage.

Q And have you any idea what the percentage is ?

A No, I have not.

Q And that would be added to the prices that you have here because you are starting....

A That is right.

Q That is one of the intangible things about the use of coal ?

A It is, but it is a small one.

THE CHAIRMAN: What causes shrinkage ?

A The moisture has evaporated largely and in the case of say, Canmore, only 1.6% moisture and your shrinkage is negligible. If you had lignite your moisture is 24% and if it was hot weather you might get 2.6 or 10% of the moisture.

Q MR. STEER: Is the coal better fuel by reason of the shrinkage ?

A Yes, the same number of heat units that you bought in the first place and the shrinkage has no relation to the heating value of the coal.

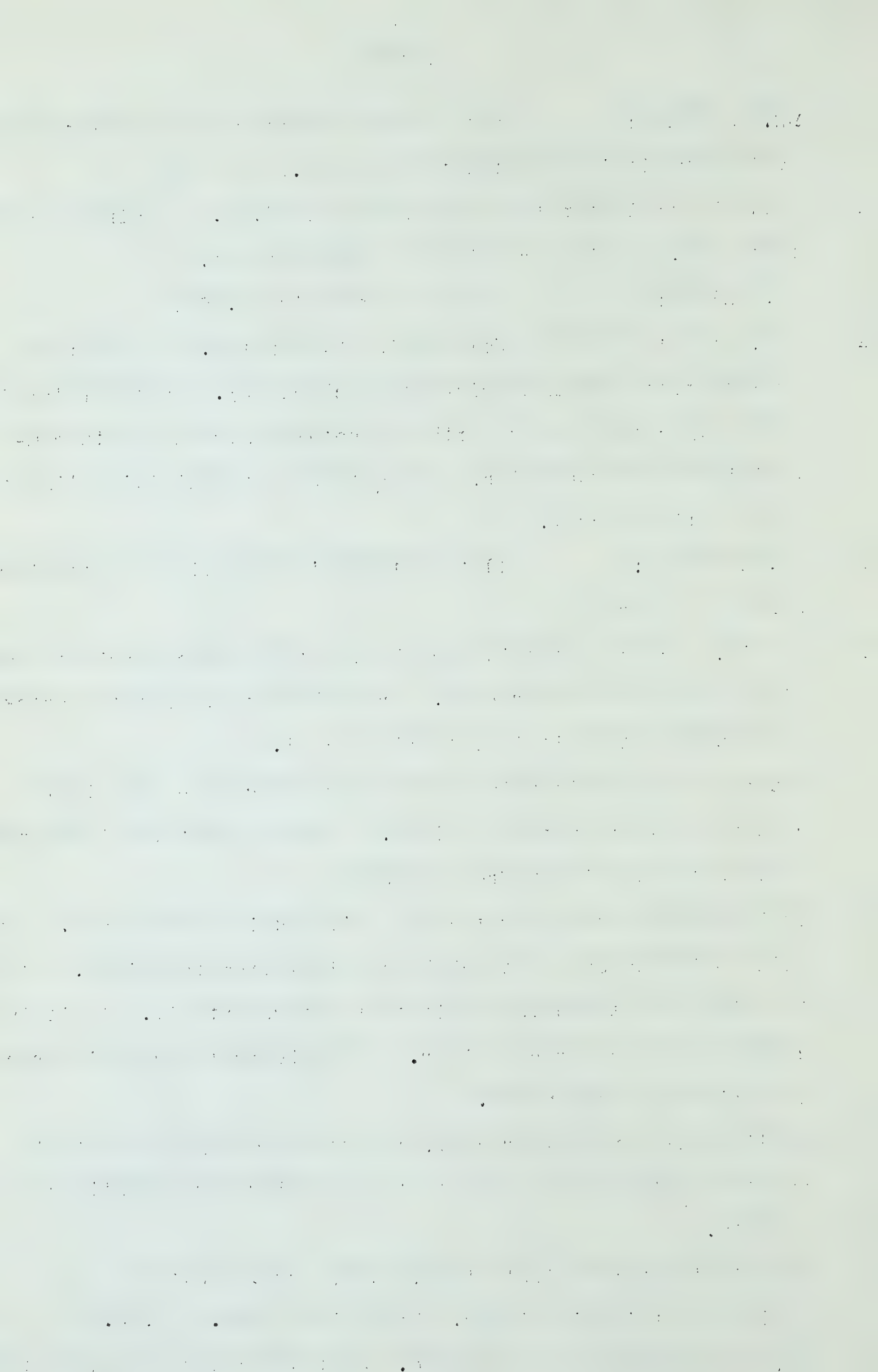
Q You do not have to use the heat to drive the water out ?

A That is right, sir.

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5775 -

- Q MR. McDONALD: And the same freight rates from Lethbridge to Calgary it is reported to me as \$1.90 a ton ?
- A Well the freight rate from Canmore is \$2.00. I think I have that here. It is very little I have not got.
- Q MR. HARVIE: You mean Canmore is \$1.50 ?
- A Yes, from the Crow to Calgary is \$2.00 a ton. I have the freight rate from Lethbridge to Macleod 65¢. Oh the Lethbridge coal only comes as far north as Okotoks where it meets competition from Drumheller, and Okotoks is the dividing line on the relative market.
- Q MR. McDONALD: Well then there is very little Lethbridge sold at Calgary ?
- A No sir, because Lethbridge coal plus the cost of freight comes higher than Drumheller coal. Drumheller coal goes to Okotoks and south of that it is Lethbridge coal.
- Q You have not provided in your Lethbridge coal - the first column a dollar charge for lump. Do you expect the individual dealers to buy direct from mines ?
- A In Lethbridge you can get coal delivered in truck loads. You will notice those are truck loads right from the mines. It is only where there is credit that enters into it. If it is cash you pay the truck driver. He delivers the coal in truck lots right to your house.
- Q Dealing with Drumheller coal, did you find any dealer that has the cost of delivery set at one dollar for domestic coals ?
- A Yes sir.
- Q That is the three first items, lump, egg and nut ?
- A Well nut I think is higher. There is a loss. \$1.45.
- Q No, I am speaking of delivered. Just why did you go down to 55 cents to the stoker ?



Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5776 -

A Well a whole truck load instead of half a ton or ton can go five miles. In fact it is quite interesting to go to coal dealers on a cold day and see people ordering half a ton of coal to go to Hubalta, miles away, a matter of five miles out and five miles back for a very light load and I can see where the dealer is entitled to what he gets. But when you come to unload a carload of coal it is a full truck load and short hauls in the city.

Q Dealing with stoker coal, you have it 55 cents ?

A Yes.

Q In investigations I cannot find a dealer under 75 cents. Is there any preponderance of dealers who are selling today at 55 cents ?

A I am informed that the School Board figure is less than that, their cost.

Q The School Board are buying ?

A Carload lots.

Q For twenty-five schools at one time ?

A In 1939 they were practically all on coal.

Q I mean at the present time, is it not so there are about twenty-five schools on gas and twenty-five on coal now ?

A They have been going on to gas since the rates were lowered, ever since 1939.

Q That is a fact now, there are twenty-five schools ?

A I cannot tell you.

Q You cannot tell me ?

A No.

Q But in any event the School Board is buying for a good number of schools ?

A That is right.

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5777 -

Q And many thousands of tons ?

A That is right.

Q By one order and by contract ?

A I cannot tell you. I think they get delivery from Priddis by truck lots. I know the price is \$5.50 a ton. I believe it should be delivered directly to the school. I do not think that is by contract. It may be but I do not think so.

Q Do you know how much Priddis coal the School Board bought in the last year ?

A No, you mean in tons.

Q Yes.

A No.

Q My information is that the Priddis mine has been closed for some months. Do you know anything about that ?

A I think that is right. I think it is a summertime operation if my information is correct.

Q Do you know if it was operated in the summer of 1945 ?

A Yes, I think it was.

Q For how long ?

A I don't know that. I know I have passed coal trucks out of there in the summer of '45.

Q Now dealing with the Canmore coal. You have the steam over one inch price \$6.97 ?

A Yes sir.

Q Do you know where any sales in Calgary made of that coal outside of the School Board ?

A It is available for use. I do not know of any sales, no.

Q My information from the dealers is that it is available in the neighbourhood of \$7.25 a ton.

A Where ?

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5778 -

Q \$7.25.

A The one inch size ?

Q Yes.

A Well I have a letter from Mr. McCann of the Coal Operators' Association which gives the prices I have given you there and I do not see any change.

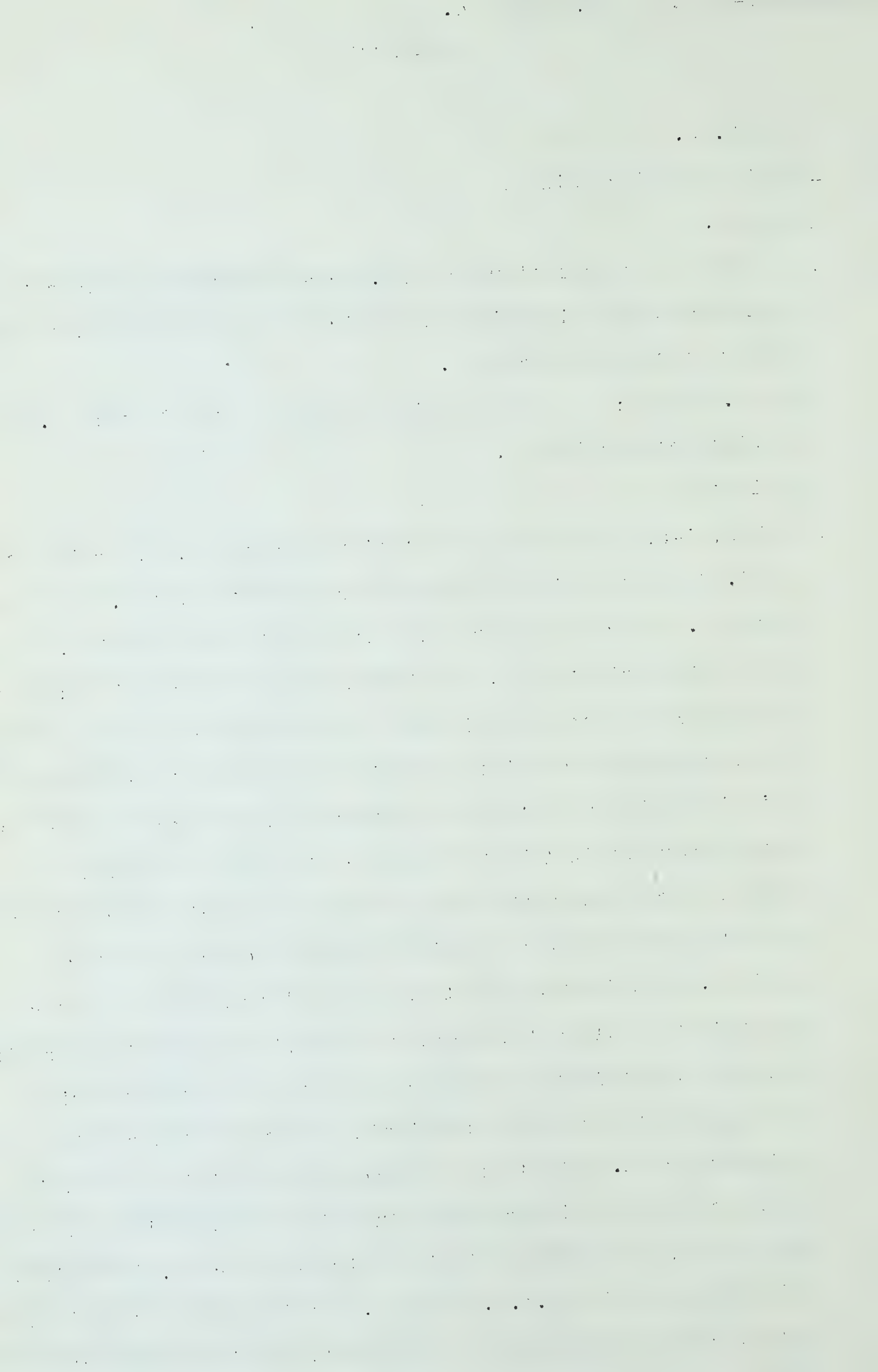
Q MR. HARVIE: What is the date of the letter Mr. Davies ?

A 31st October is one.

Q Last year ?

A Yes, '45, and I have a quotation from the A. P. Grain for \$4.97 and that is the latter part of October too, the same thing. It could be around, but that is my authority, and I have them right here. I might say when you mentioned that one inch Canmore coal is a very excellent coal and they have a large number of different sizes for specific customers and it is of interest to know that probably the most efficient coal burning plant in the Province is at Exshaw burning Canmore coal in part and they have an efficiency considerably over 90% powdered coal using Canmore and Crows Nest coal mixed. Now if you want to buy a coal from Canmore you can get just about what you order by varying these sizes or mixing them and get just about exactly what you want for various types of stokers and for buildings a small stoker using Canmore coal. First of all Canmore coal will use well in a stoker as shown in Professor Stansfield's bulletin 146, one of the best, and secondly it is a high grade coal, low moisture, low ash and high B.t.u. content. It is the one coal in Alberta that can be used in the new anthratube which was described by Mr. Brownie in his brief.

Q MR. McDONALD: I understand there is one mine at Canmore



Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5779

which is semi-anthracite. Do you know anything about it ?

A I know there is some semi-anthracite from the area. I do not know that it is being worked now.

Q It is particularly good and it is a one mine proposition. This Exshaw plant, we will go into these efficiencies. This Exshaw plant is a pulverized coal is it not ?

A That is right.

Q And it is built especially to handle only Canmore coal ?

A Well it is. It does not use Canmore coals exclusively. It uses a mixture of Canmore and Crow.

Q Have you conducted any experiment with the efficiencies of coals along the lines that you mentioned for gas ?

A No, I have taken the results of Prof. Stansfield's publications and the Research Council of Alberta. Two of them have been put in, but there are a great number more besides that.

Q Now in regard to this gas efficiency. Did you actually conduct these experiments ?

A I calculated out the Calgary General Hospital a couple of times.

Q No, I mean your....

A Well the experiments that you refer to is a calculation ?
Yes.

A And all the calculation is a set of circumstances on any burner. It is not an experiment. The fire is going on and you try to get the facts out of that fire and set it down and calculate it out.

Q Where did you get 400 cubic feet equals 16 pounds of gas ?

A You can take that out of any particular chemical engineering handbook. Under our present day conditions it is 386, one pound more in this territory and we are under thirteen and a

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5780 -

quarter pound pressure. That is at 65 degrees fahrenheit that I gave you. It is approximately 400 cubic feet equals one pound. Your volume of gas weighs 16 pounds. That is just out of an ordinary engineering handbook.

Q Would not the amount of steam depend upon the dehydration of the gas ?

A No, Mr. McDonald I think not.

Q I do not know anything about it.

A That has nothing to do with the free water in the gas at all. This is the hydrogen in the gas combining with the oxygen to make water.

Q And your CO₂ or your carbon dioxide calculation is again a standard calculation.

A Oh yes, I gave them as approximations because there is no point in working them out to a fine degree of accuracy because in each burning establishment there are slightly different conditions of burning.

Q Now then you made your observations at the Calgary General Hospital ?

A That is on an industrial plant, yes.

Q About how many thousand cubic feet a month ?

A 6000 Mcf. Just a shade over 6000 Mcf. in the winter time. It is quite a size. You see it comes on a very low rate in the schedule.

Q Now how is it metered in. Is it metered in at eight ounces ?

A Yes, it is metered in at I presume eight ounces. It varies from seven to nine ounces.

Q Now how many other industrial plants did you look into ?

A I went around to see a number of plants owned by or operated or run by the Toole, Peet people, buildings. There is nothing

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5781 -

much to see. You can go in and look at them, but they are old types of boilers with an adapted gas burner in them. They are old hand fired coal boilers and just a burner put in them. The best burner the Gas Company could advise them to put in, but they are not particularly efficient and it is not much use. The only experiments I could see worth while doing on them and we shall continue probably to work on that for a while, is to take a continuous CO₂ recording on the flue temperature and the flue gases and get some idea how much excess cold air is going through the fire box, but it is large. Now with regard to houses. You know I am interested in some houses and I naturally have a good idea of seeing them work, going into it in some detail and I have conducted an experiment with my own house which is of some interest.

(Go to Page 5782)

T-3-1 11.40 a.m.

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5782 -

A As I mentioned - is this an answer to your question?

Q Yes?

A I mentioned the fact that the ordinary house was not very efficient. Although I have a gas-fired boiler, and I mentioned the question that I had a thermostat on it. The thermostat went on full and off; on full and then off, and dragged cold air through the flue. So commencing last Fall, I conducted an experiment on my own house, and this is translated into dollars and cents. I turned down the rate of flow of gas into the burner to about half the normal rate, so that when it turned on it could not go on full. That is one thing I did. The other thing I did I insulated the boiler in the basement. Now I will read to you the bills for the year 1944 and again for the year 1945, translated into dollars and cents, just to see the difference in them. We are assuming that the two winters are approximately the same in temperature. If anything this winter is a little bit colder than the winter of 1944-5. Now the December bill, 1944, \$17.28, and for 1945 was exactly the same \$17.28. If you will remember November 1945 it was a cold month as compared to November 1944. You remember our snow came on the 4th of November, 1945, this last winter. Now we come to January 1945, it was \$25.92, and January 1946, \$19.98. February 1945, \$18.96, and February 1946, \$17.55. Now just those two slight things gives you some indication of the vast field there is for improvement in the burning of gas in the ordinary domestic appliances and commercial appliances in this city.

Q That is a matter of education?

A Oh entirely.

Q Now, then you gave us, I understand, the lower efficiency

Stanley J. Davics,
Cross-Exam. by Mr. McDonald.

- 5783 -

starting at its maximum say of the hospital at 80%, and you then came down to an industrial efficiency, to a minimum of 50%?

A I would say that the domestic efficiencies are around 50%.

Q Oh, that was it, and industrial efficiencies did you say 60?

A For gas?

Q Yes, we are speaking of gas only?

A Coming back to the Burns Company, for instance, or a better one still take the C.P.R. That great big high smoke stack you see behind.....

Q Yes?

A I do not think they get higher than 60% because they have to heat that gas going out of that great big long tall stack.

Q You do not know the exact figures on that?

A No, they do not themselves. When you get into the thing you speak to the engineer and he will tell you he has a high efficiency. The only way you can work this out is to take the actual recorded data and figure it out yourself. With City buildings and City utilities naturally, I am able to speak as to that. You might not agree with my figuring but I am able to get the exact facts. But to get it from the C.P.R. in that particular plant was, as I say, difficult.

Q Can you form any opinion as to the amount of industrial gas on the whole that is used in Calgary on the average - but I am thinking of more of commercial?

A As far as is concerned, I would say if you take 70% as the - if you take the General Hospital as the high at 80%.

Q Yes?

A From there you go on down to 60% or so, around there. I do not know that I can answer the question any better than that,

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5784 -

unless you want an average.

Q Yes?

A I cannot give you the average.

Q 70% would be reasonable from your investigation?

A It would be too high. There would be more 60% users than there would be 80% users.

Q Possibly with some education, the efficiency could be pretty well averaged out at 70%?

A It would take a lot of new equipment. It would take a new boiler plant for Burns, for instance. I think they are going to put one in anyway. It will take a new one, and when they put in the new one they can expect 78.5% efficiency for gas.

Q For gas?

A For gas. I might say a new one was put in at Swift's in Edmonton.

Q For gas?

A For gas, and that is the manufacturer's suggested efficiency, 78.5%. That is his top.

Q And that would be placed in competition with coal in Edmonton?

A That will be his suggested - I do not know the coal figures, but that is the gas figure.

Q But I mean coal is plentiful in Edmonton?

A Yes.

Q Of the type and quality.....

A I am not saying that has been put in. I am saying that is the manufacturer's suggested basis of comparison of what the fuel efficiency would be using natural gas in a new plant in Swift's in Edmonton.

Q So that if anybody had to make a capital expenditure in his power plant, he could pretty well look for 75 to 80% efficiency with gas?

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5785 -

A That is right. That is top, with a new plant and everything right up to date. That is his top.

Q And with that he would have all the efficiencies and all the advantages of using gas together with his efficiency of B.T.U. consumption?

A As we suggested. He would have a top of 78.5%, and whatever other conveniences you can put into that, or any advantages you put in with it.

Q Take coal now, have you made any similar calculations as to flue temperatures and that type of thing with coal? I thought you told me you had?

A Yes. You see coal has a bed and the draft is drawn through the fire bed and the rate of burning corresponds to the draft. You have not got such a cold air problem with coal, and that is one of the reasons, nor is there the same high hydrogen content with all coals, so that you have less loss for that reason. With a properly designed coal plant you could get very high efficiency. Like Exshaw. I failed to talk the engineer at Exshaw out of the fact that he is not getting 100% efficiency in coal, because he is burning it and all -I could talk to him about was hydrogen. That is as far as I could get. When you come to talk to people who are producing actual results, they have got something to talk about, and coal will give you in an industrial plant very high efficiency using the right coal and the right type of equipment. You have to put them both together. We happen to have good coal and lots of it, and sold for a very low price for small sizes. And that helps the miners. They can use more mechanical equipment if they get rid of these small sizes of coal. So that we find that like the C.P.R., for instance, I can easily see where gas could not be in Alyth for two reasons. One, the

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5786 -

very low price that they will develop steam with in that plant, and secondly, they are going to haul the coal and as it were they own the pipe line.

Q There are many other economic features enter into the railway using coal?

A That is right.

Q And still they use gas in the central power plant at the station do they not?

A I believe that is also under consideration as to seeing what the future brings forth in the way of this new plant, and then the choice will be between a high efficiency gas plant and a high efficiency coal plant.

Q Yes. Both new installations having the advantage.....

A Both brand new, yes.

Q And then the question of the other advantages enter into the picture, that is as far as gas is concerned?

A Yes. I do not just see the other advantage. There are certain disadvantages. Now you have brought it up twice and I think I had better explain what I mean. In the schools we have janitors and the janitors work longer hours than the ordinary employee, of anyone employed here. The hours are too long. They would like very much to put more men on, as janitors, and by doing so they could get down to approximately a 44 hour week, and by using stokers, the cost of the extra man would be partly paid for by this coal. So that is one case where a so-called advantage turns out to be a disadvantage in using gas.

Q Do you know there were tests made by the engineering staff of the School Board as to the use, that is the comparative use of coal and gas?

A Yes.

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5787 -

Q And financially gas was the cheaper, was it not, with automatic control?

A No. Would you like me to read you the figures? I have not got any permission to use these figures, but I have them and I do not see any particular objection to reading them.

Q The report I refer to is the report of February 21st, 1944, presented to the School Board in open meeting.

A Well I do not know anything about that. I do know about this one. Two schools, one with a stoker and another one exactly the same design and everything else, with gas. In one the gas cost \$630.29 plus \$30.00 for capital investment on it.

Q MR. CHAMBERS: Are these actual installations?

A Yes. The other one, the stoker, the cost of the fuel was \$391.70, and \$100.00 for the charge to capital investment and \$16.00 for power.

Q MR. HARVIE: What date is that?

Q MR. McDonald: What about labour?

A I gave you labour a moment ago.

Q Would you just continue and just give us the figures?

A I mentioned labour before. If you want to charge labour to that.....

Q The man who is spending the money charges labour to it. What figures did Mr. Brandon give you? Let us put in the whole record?

A I want to tell you about labour. You can get a false answer to any set of figures.

Q First, Mr. Davies, would you put in the labour and we will discuss that? If Mr. Brandon is wrong.

A If the allocation for labour is correct.....

Q Yes? What would it be?

A Winter assistant, \$391.14.

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5788 -

Q That is right?

A Now then, may I explain this, Mr. Brandon tells me that they would like to have an extra man to clean the snow off the sidewalks and to attend late meetings. At the moment the janitor in a school of less than 16 rooms, comes at 7 o'clock in the morning and he has to, on a day like today, for instance, that is wet, mop out the school. If there is a meeting at night, he has to come back at the night meeting. They would like to have other men and during the war years they could not get labour. This was prepared in 1944. Under the circumstances now that \$391.00 and some cents would help to pay the costs of the additional janitor which they sorely need. So that there are two sides to every question.

Q MR. CHAMBERS: Can you give us the names of the two schools?

A Yes. The first one with the stoker was the King George School, and the Sunalta School was the one using gas. They are exactly the same plan. I asked them for two schools of exactly the same plan. There is only one thing I want to qualify it by, and that is in the ventilating system, you have to have two men who will operate the ventilating system, at approximately the same rate, because if you get too much air in one school - both experienced janitors have to be in both schools to get comparative figures. If you want to take these two and calculate them out, you will find the efficiencies of the Sunalta and the other school are about equal, and on the prices of coal given, there is a substantial saving in coal, and the balance is made up by charging that extra man to it. That is the whole story.

Q MR. McDONALD: The result of these figures is, I think you have exactly the same figures, that the average cost

1-5-50
Stanley J. Davies,
Cross-Examined by Mr. McDonald.

- 5789 -

per year, using gas, with automatic control, \$710.29 and coal, stoker-fired, \$898.92?

A That is right.

Q Now let us get back to this Burns plant. We were speaking of it as a typical plant, I understand?

A No, not at all. I never mentioned the word "typical" plant at all. I just mentioned it. It was an industrial plant, and uses a very large quantity of gas. We would hate very much to lose it.

Q Do you suggest that the results obtained at the Burns plant would be indicative of the results that could be obtained at other plants?

A With coal?

Q With coal or with gas?

A No, I think Burns is inefficient using gas. Now a good new coal-burning plant in Burns is a different story altogether. The Burns plant right now is not efficient, even using gas.

Q Well let us deal with a typical plant?

A Take the General Hospital, that is the best one I know of, and the one I know best.

Q I am just saying a typical plant, using about the same capacity of heating value that the Burns plant would require?

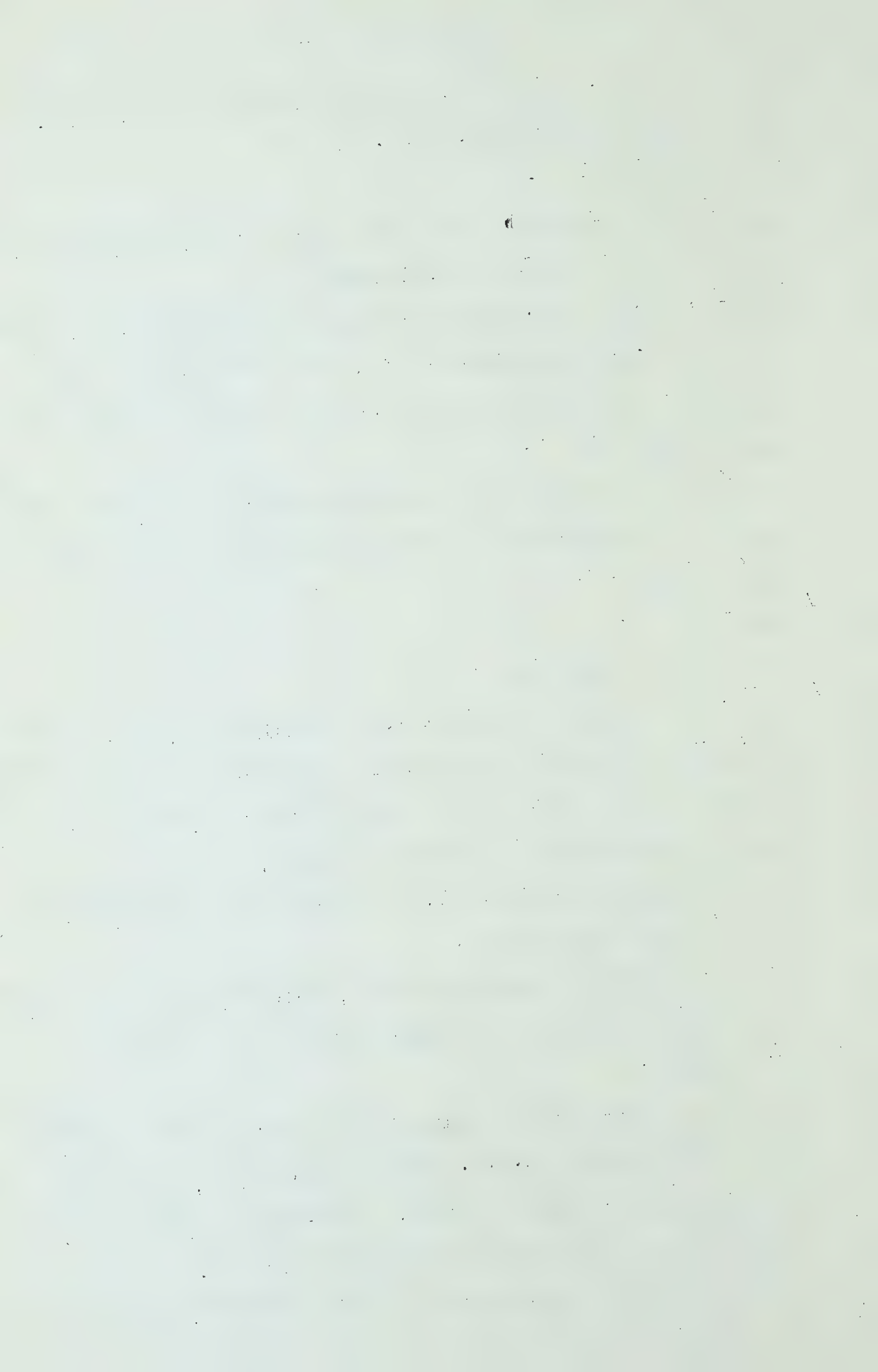
A All right.

Q If you are using coal, using in the neighbourhood of say 28 to 30 thousand M.C.F. of gas per month, you would require about 14 tons of coal, depending on your coal?

A I would have to sit down and figure this out.

Q Just assume with me you would require 14 tons?

A All right.



Stanley J. Davics,
Cross-Exam. by Mr. McDonald.

- 5790 -

Q How many months' supply of coal would you want to have on hand to guard against emergencies such as railway, interference with transportation and strikes and that type of thing?

A Well I do not know.

Q Would you estimate three months as being required?

A Well I will assume three months.

Q Is that reasonable?

A I do not think it is, but nevertheless I will assume it. You do not need three months. They do not need any more than they have right now. They have a standby right now in case the lines go.

Q How much coal have they got?

A I cannot tell you that. I know they have a big coal pile there. That is all I know.

Q It is customary that anybody using coal always has a stand-by pile, don't they?

A Anybody using gas you mean?

Q No, coal?

A Well they have to have both. They have both. Burns has a stand-by for coal right now, and I think all except two of the big industrial consumers have stand-bys of either oil or coal right now. They also have the same if they were burning fuel oil, they would have a little more fuel oil. That is all you need.

MR. FENERTY: That is one of the advantages over gas, you can have a reserve.

Q MR. McDONALD: Would it be fair to say you would have a month's supply of coal on hand?

A That is right. I would agree with a month but I would not agree with three months.

Q Three months is a little too much?

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5791 -

A Oh yes, you might as well say you might have a year's supply.

Q Can you tell me anything about the handling of ashes? You get ash?

A Every coal has different ash. Every coal has a different problem of ash. Some clinker and some don't. Some have a lot of fluff dust and some do not.

Q It all gets down to a question of labour to handle it?

A It gets down to mechanical equipment to handle it, Mr. McDonald. The day of labour is about out. It is all mechanically done these days.

Q Unless you have a place to put it on your premises, you have to move it off?

A It has to be shipped out.

Q And that is a question of trucking?

A Yes, or loading it on a car.

Q That is a cost you do not have with gas?

A That is right.

Q And that is a cost you have not taken into account in the figures you have given us, based on straight efficiencies?

A That is true.

Q Now each installation requires machinery to handle the coal to move it from the storage to the plant?

A Yes, that is right.

Q And you require a similar installation to remove the ashes out to your loading platform?

A That is right.

Q And that is a cost that has not been taken into account?

A That is the capital cost of the equipment, as you put it.

Q Now then, what about dust, smoke and damage?

A There are smoke ordinances, and I am all for them. Modern coal equipment burns coal within the smoke ordinance.

T-3-11

Stanley J. Davics,
Cross-Exam. by Mr. McDonald.

- 5792 -

Q Is the equipment installed in most commercial buildings in Calgary, say apartments that you have inspected, of that type?

A No.

Q They would have to.....

A They would have to have, to burn coal, well even the Noble Hotel, which burns Priddis coal at a cost of \$5.50 a ton, and I do not think the owner is interested in the Priddis mine. It is a question of, in putting new equipment in any one of these new commercial buildings, of putting the proper equipment in in the first place, and I have never suggested going back to the use of old equipment with coal was a particularly efficient job. I think I mentioned a figure of 40%, sir. But I do say with new equipment, utilizing coal, including its capital cost, that you can go down now and compete with prices that I have outlined in the memorandum that will be submitted.

Q All of the new installations regarding coal use some electrical power to operate the moving parts of the installation?

A That is right.

Q And the cost of that power should be added to the difference in coal?

A Yes.

Q And where you have many movable parts you also have a continual repair bill?

A You have a repair bill.

Q And it is true, too, that there is sulphur in the coal that causes corrosion?

A Sulphur in the coal as well as there is sulphur in the gas.

Q But there are no moving parts in the way of gas fittings?

A I have one of these gas-fired boilers, and if the repair bill is any higher with coal-burning equipment than it is in my

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5793 -

thermostat, I will think that one over, about which is the higher.

Q I was interested in your figures regarding Lethbridge commercial institutions, commercial installations, and I understand most of them are operated on - most commercial premises use coal, is that right?

A That is my understanding, yes.

Q So that the present day saturation, as far as gas is concerned, is limited?

A Is domestic saturation.

Q Yes, and do you know just how high the domestic saturation is in gas in Lethbridge?

A I do not know.

Q You will agree with me it is fairly high?

A I would think so.

Q But commercial saturation is limited?

A Yes, it is coal that has it saturated.

Q So if there is any change in price in Lethbridge, the change will be in the - the effect will be on the domestic user?

A I would think so.

Q So there is very little commercial market to be lost by the Gas Company in Lethbridge?

A I will agree.

(Go to page 5794).

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5794 -

Q It would follow, therefore, that so far as commercial installations are concerned, we should not use Lethbridge as the yardstick?

A Well I do not know, Mr. McDonald, my view is that it would be a very fine one. If you do not want to increase your price, and you do not want to lose markets in Calgary to coal, then you should look at the situation in Lethbridge very carefully, it depends on what you are going to do, what kind of yardstick you are looking for. On the other hand, if you are interested in selling coal, well then Lethbridge is a good place to go to find out its competitive figures in that regard.

I might say, Mr. McDonald, I talked to these coal people a long time and they are quite conversant with all this new equipment which is coming in, and they never before have put on a proper advertising campaign or properly qualified men to sell coal, and they now feel that, with the co-operation that they can get from the Research Council of Alberta, and new equipment that is coming out, - I do not mean the Research Council of Alberta is going to sell coal, but the Research Council of Alberta is going to conduct for them certain experiments along that line, and they feel that by going after the coal, they will take away from the Gas Company certain commercial and industrial institutions that the Gas Company now have.

Now all I am pointing out to you is that an increase in the price for natural gas gives them that much better opportunity for doing what they plan to do

Q That is, the way to counteract that, of course, is to improve the selling power of your gas?

A The efficiencies of the gas-burning appliances, and I may say that the Gas Company have a most efficient staff, and if you

Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5795 -

go in there with a high bill they will look into it and if it is your equipment they will advise you, but the effect of it, Mr. McDonald, is to reduce the consumption, constantly reducing consumption per customer, that is the effect of it, and I would like to give you some figures here, I have them on the Valley, as you know I am interested in that, as to just what that price does to the customer's consumption.

As you know, sir, I am familiar with it. In the month of January, the Valley Gas Company, as you are aware I am the Managing Director of the Valley Gas Company and we have one wholesale customer, and in January we supplied that customer 16,112 M.C.F.; now that customer has 227 individual customers. One customer to us, the wholesale one, but that customer has 227 individual customers.

Q MR. HARVIE: Who is the customer?

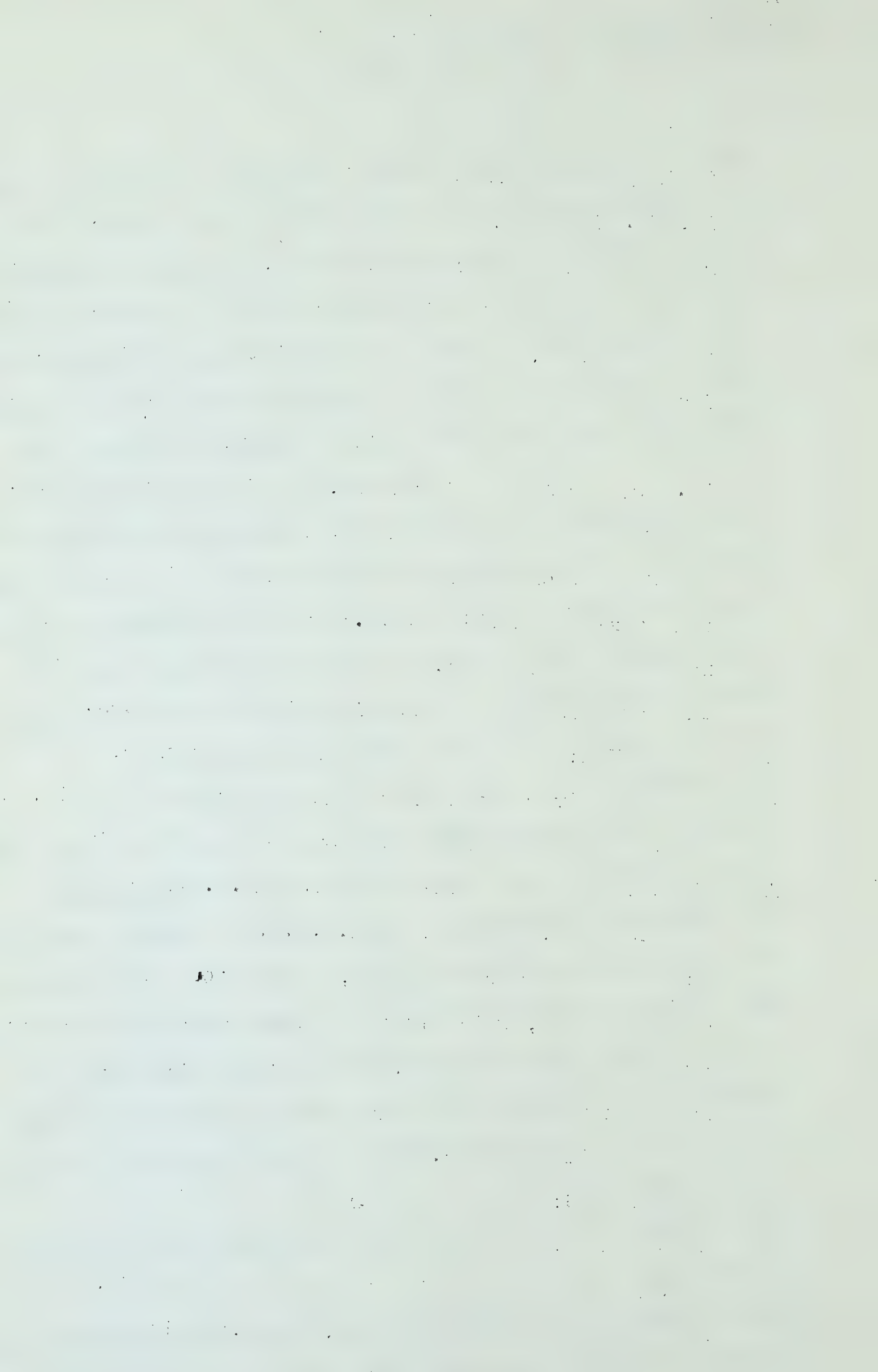
A The High River Development and you are aware of it, Mr. Harvie.

Q I just wanted to know which one you were talking about?

A 113 customers on meter used 4,503 M.C.F., and 114 customers not on meter, used 11,609 M.C.F.s. Now those 114 customers used slightly more than 100,000 per customer and on the rest of our system, which is something over 500 customers, the average is less than 25,000 per customer, so if a customer is not on meter, he uses four times as much gas as he does when you put him on meter.

Q MR. CHAMBERS: Are they identically the same kind of customer?

A Yes, you asked a pertinent question there, Mr. Chambers, these 113 are on the big buildings, the 4,503 is the barbers, machine shops and the hotel down there, and the garages and all the stores in Longview and Royalties, and the 114 are all the little ones, the advantage being opposite to what you might



Stanley J. Davies,
Cross-Exam. by Mr. McDonald.

- 5796 -

have thought and had in mind.

MR. CHAMBERS: No, I was just asking for information.

Q THE CHAIRMAN: How much is the line loss on that?

A Well I find on our system that includes delivery down to this plant, some 25 miles of line, and we have now cut the line loss down to approximately 5%.

Q On your end of the line?

A That is right. It is not nearly as serious a matter as I thought it was. Waste. Now let us see, commencing in the fall of 1944, I put 150 meters on similar types of customers and in 1946, by the way I completed doing that in April of 1945, and in 1946 the new customers with meters are indistinguishable from those who had meters before. You just cannot pick them out.

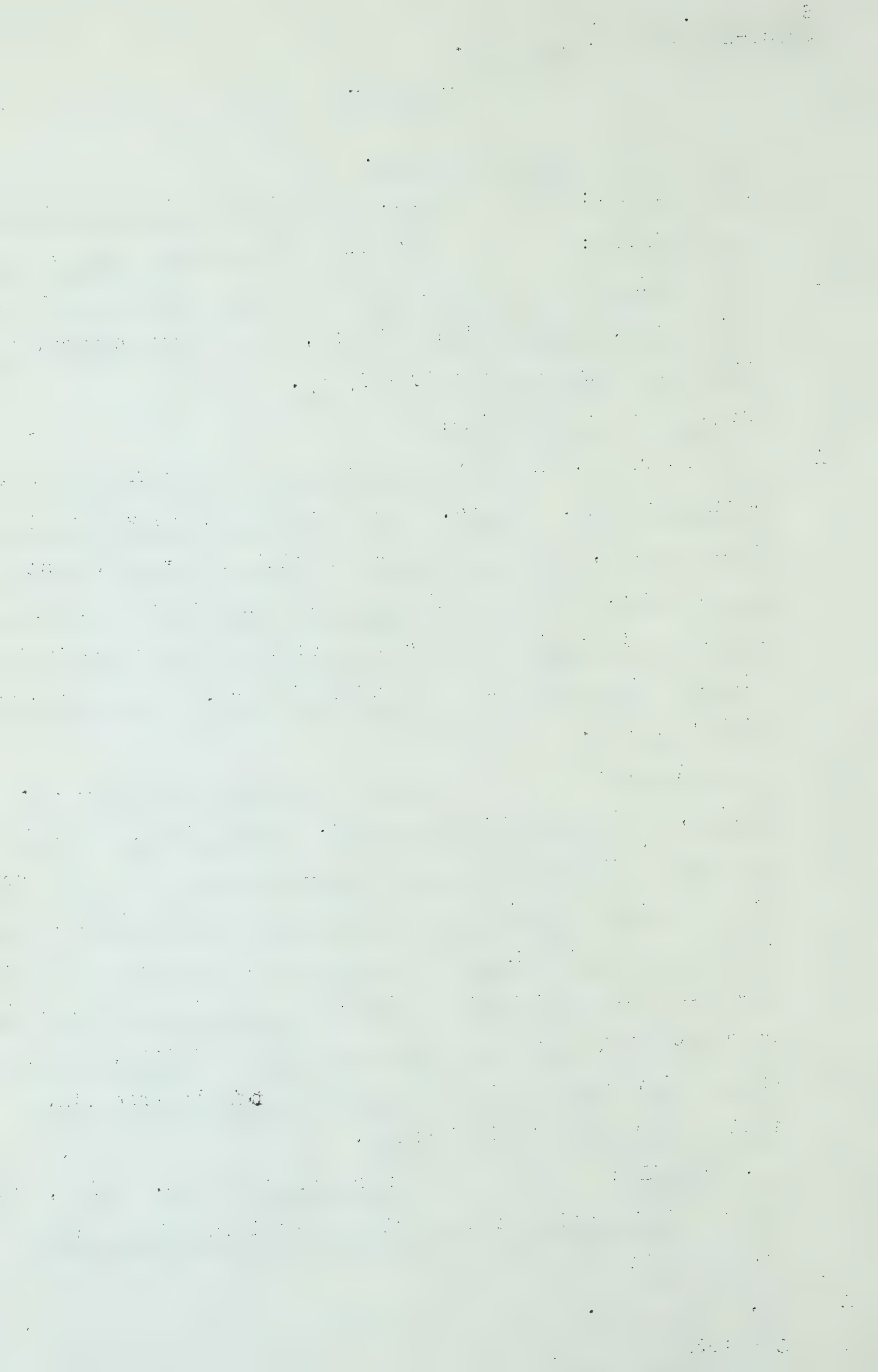
Q THE CHAIRMAN: There is no doubt about it, Mr. Davies, it is not arguable at all, that people on a flat rate are more wasteful of gas than people on meter. I have run into the same question on the question of electricity, where they did not have enough meters and they had some on a flat rate and some on meters. All the householders on the flat rate used very much more than those on the meters, the ladies on the flat rate had the ladies of the neighbourhood into their house to do their ironing.

Q MR. McDONALD: One more question, Mr. Davies, have you any information on the price of coal in Calgary some years back?

A No, I have not.

Q Say 1933 and 1934?

A No, I have not, and the reason I did not go into it was because we did not have the coal appliances in 1933 that we have now, to use it, and the only valid comparison was, as I saw it,



Stanley J. Davies,
Cross-Exam. by Mr. McDonald.
Cross-Exam. by Mr. Chambers.

- 5797 -

with the present day equipment.

Q Yes, and to make it clear then, the efficiencies you speak of with coal do not generally apply to the installations which are now in?

A No, these are nearly all old installations and I am not talking about that.

THE CHAIRMAN: Mr. Harvie?

MR. HARVIE: I think Mr. Chambers has some questions to ask now.

THE CHAIRMAN: All right, Mr. Chambers.

.....

CROSS-EXAMINATION BY MR. CHAMBERS.

Q Did I understand you to say, Mr. Davies, that the schools were changed from coal to gas after the 1939 change in rates?

A No, some were changed in 1945.

Q Were there not several changed before that?

A It could have been but I did not know about them. The big change has been since then.

Q My information is that the Western Canada High School was changed back in 1935?

A It could have been.

Q So when you talked about the changes being made from 1939, is that just an estimate you made or is that on information which you got?

A No, that, I think, is a matter of record. The records can be produced from the schools.

Q I am trying to find out from you the basis of your exact figures?

A My basis is the School Board.

Q The School Board told you?

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5798 -

A I went and talked to the Building Superintendent, as to when the schools changed and why. There were a lot of factors, could not get janitors and could not get the type of coal they wanted, and all that.

Q And did he not tell you that some were changed before 1935?

A Well if I am right, I think Western Canada has always burned coal.

Q MR. STEER: Did you say the Western Canada High School?

A The Western Canada High School.

Q MR. CHAMBERS: And is it not also a factor that the smoke influenced the School Board to some extent as to the change?

A It could be that. The hand-fired ones, yes, but with the stokers I do not think so.

Q Not with the stokers, there would be no complaint?

A I do not know of any.

Q Or any cause for complaint if the coal was used in a stoker?

A Not a properly set up stoker.

Q In a residential area?

A I think so.

Q You are quite definite about that?

A I have looked up a lot of ordinances.

Q I am not talking about ordinances, I am talking about.....

A In Calgary you mean?

Q What I am talking about is this, aside altogether from workmen, you have a school located in a residential area, and you may have sufficient smoke and yet that will not contravene any ordinance, but it may cause complaints from the residents of the area?

A Well that could be. King George, or Balmoral, I think is a

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5799 -

school up on the North Hill which burns coal now, but it is a hand fired school, I think there could be a legitimate complaint there, but now I am speaking of a stoker installed, a stoker properly installed, in a school, and I have not noticed any.

Q There is a stoker installed in what school now?

A I will have to look it up, sir, but several schools, but I will just give you the one I had the figures on, I was wrong about the Balmoral up there, it is the King George that has the stoker.

Q Was that just put in for an experimental purpose, or is that a permanent installation?

A No, that was put in when they were burning coal.

Q Now what I am getting at, the School Board has several schools with stokers, is that right?

A That is right.

Q MR. HARVIE: Earl Grey is what?

A Coal.

Q Coal, and there is a stoker there?

A No, hand fired.

Q MR. CHAMBERS: Is this not so, Mr. Davies, that the price of coal now and in 1945, was considerably higher than it was ten years ago?

A Coal?

Q Yes?

A I would think so, but I do not have any knowledge on that.

Q And is that not, is it not true that there is a Government subsidy at the present time on coal?

A I do not know. I have no knowledge of it.

Q I am led to understand, that and I am just asking you if you know anything about it, that is a war measure in order to keep prices down, that there has been a subsidy and there is right

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5800 -

now, of something between 50 cents and a dollar a ton on coal,
you do not know anything about that?

A I have not the faintest idea about that.

Q All right.

THE CHAIRMAN: Could you not get that from the Wartime
Prices and Trade Board, Mr. Chambers?

MR. CHAMBERS: I do not know where we could get it,
although I got the information here this morning.

THE CHAIRMAN: There are lots of subsidies being
paid, and if there is one being paid on coal you should have
no difficulty in finding that out.

MR. CHAMBERS: I think Mr. McDonald has a witness
who can probably give that information.

THE CHAIRMAN: All right.

Q MR. CHAMBERS: Mr. Davies, you will recall in the
examination of Mr. Zinder in Volume 64, Page 5065 and the
following, and I am giving you this just for the purposes of
the record so that we will know where these are, he was
cross-examined with respect to Report No. 46 of the Research
Council of Alberta, filed as Exhibit 136, you recall that?

A That is right.

Q Now as I recall it when that exhibit was put in, it had just
come and there was no chance then to read it, have you had
a chance to read it since?

A That is right, yes I have.

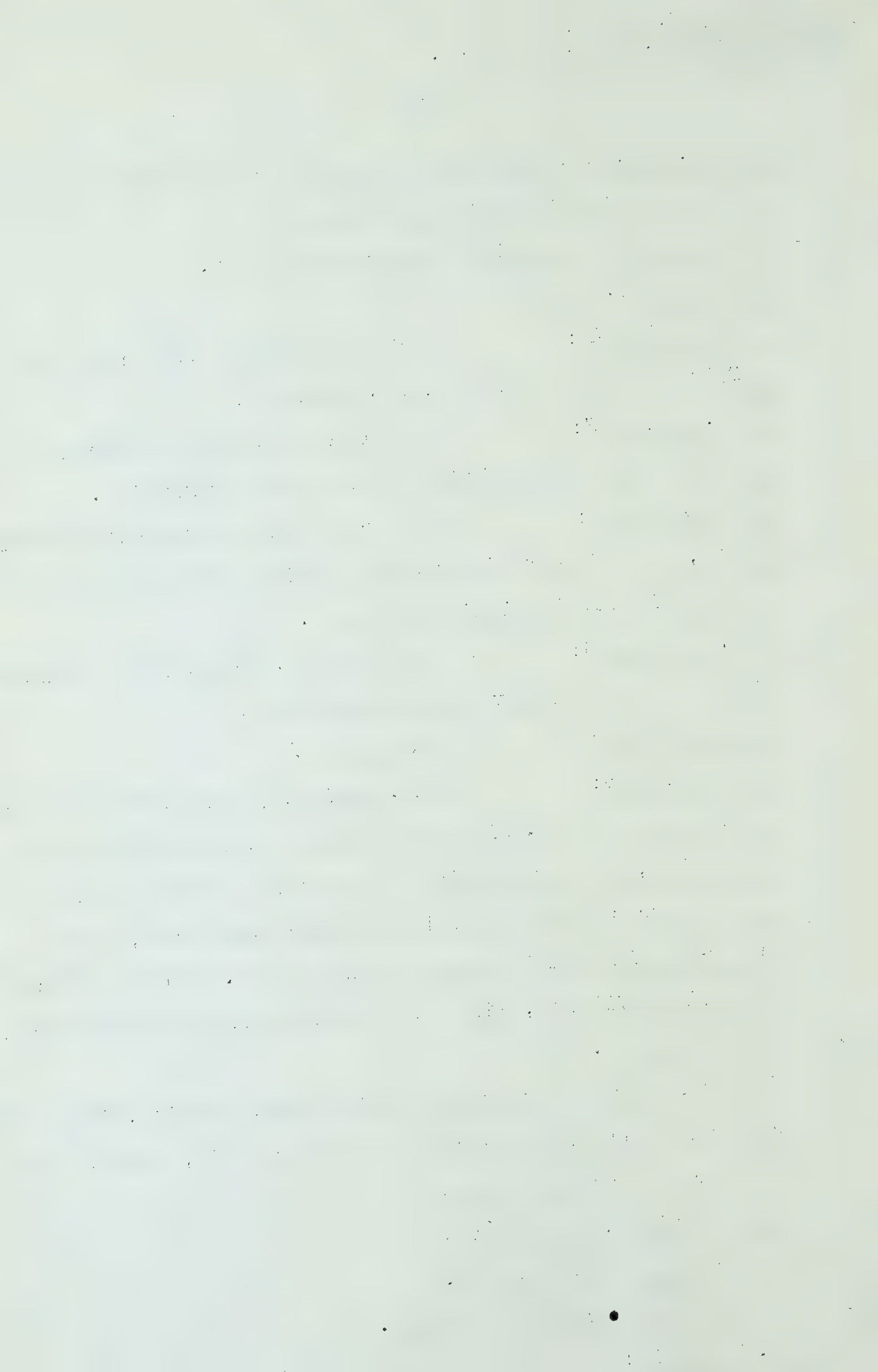
Q You have not a copy of it?

A We have one down there I think.

MR. McDONALD: I have one here.

MR. FENERTY: I do not seem to have mine here now.

WITNESS: Well it is worth while watching because
it belongs to me.



Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5801 -

MR. FENERTY: Here it is.

WITNESS: Yes, Mr. Chambers.

Q MR. CHAMBERS: Would you turn to Page 6 please,
and it says this:

" Coal is in general notably cheaper than
either gas or oil, but gas and oil are cleaner
and more convenient, and many householders are
willing to pay the higher price for the sake of
convenience."

Now you would not take it from that statement, Mr. Davies,
that coal is always cheaper than gas or oil, would you?

A Is always?

Q Yes, I mean that statement says that generally speaking?

A Oh yes,

Q But coal is not always cheaper than gas or oil?

A Oh no, it could be dearer.

Q Yes, all right. Now will you agree with me that, apart
altogether from the matter of cleanliness or convenience,
that gas is sometimes and in some localities cheaper than
coal?

A For domestic use, Mr. Chambers?

Q Well let us take domestic first?

A Now to answer that question just straight "Yes" and "No",
it could be cheaper but you see I would have to know how it
was used and the equipment and all that, it could be, yes.

Q I say "sometimes and in some localities"?

A Certainly it could be.

Q Yes, and the same would apply to oil, fuel oil?

A Yes, sure.

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5802 -

Q Now I want to make clear, are you qualifying that with respect to domestic use only?

A Well, you could have gas cheaper than coal for commercial use, but I just do not know where that locality is, but you could have it, and you could have it cheaper for industrial use, but I do not just know of the locality.

Q Now, Mr. Davies, you told me that you read Exhibit 136?

A Yes.

Q Now following your reading of that exhibit, you do not, I take it, and if I am wrong correct me, suggest that this Exhibit 136 purports or is intended to be a report of the relative costs of gas and coal for heating purposes?

A No.

Q In fact, is it not merely a report of two men at the University of Alberta as to the action or behaviour of different kinds of Alberta coal in two kinds of stokers?

A And for domestic use.

Q Well, let us forget about the domestic use for the moment, we will come to that later.

A Well that is the important point of the whole thing,

Q Will you agree with me in this, that this report, Exhibit 136, is the report of two men as to the action or behaviour of different kinds of Alberta coal in two kinds of stokers?

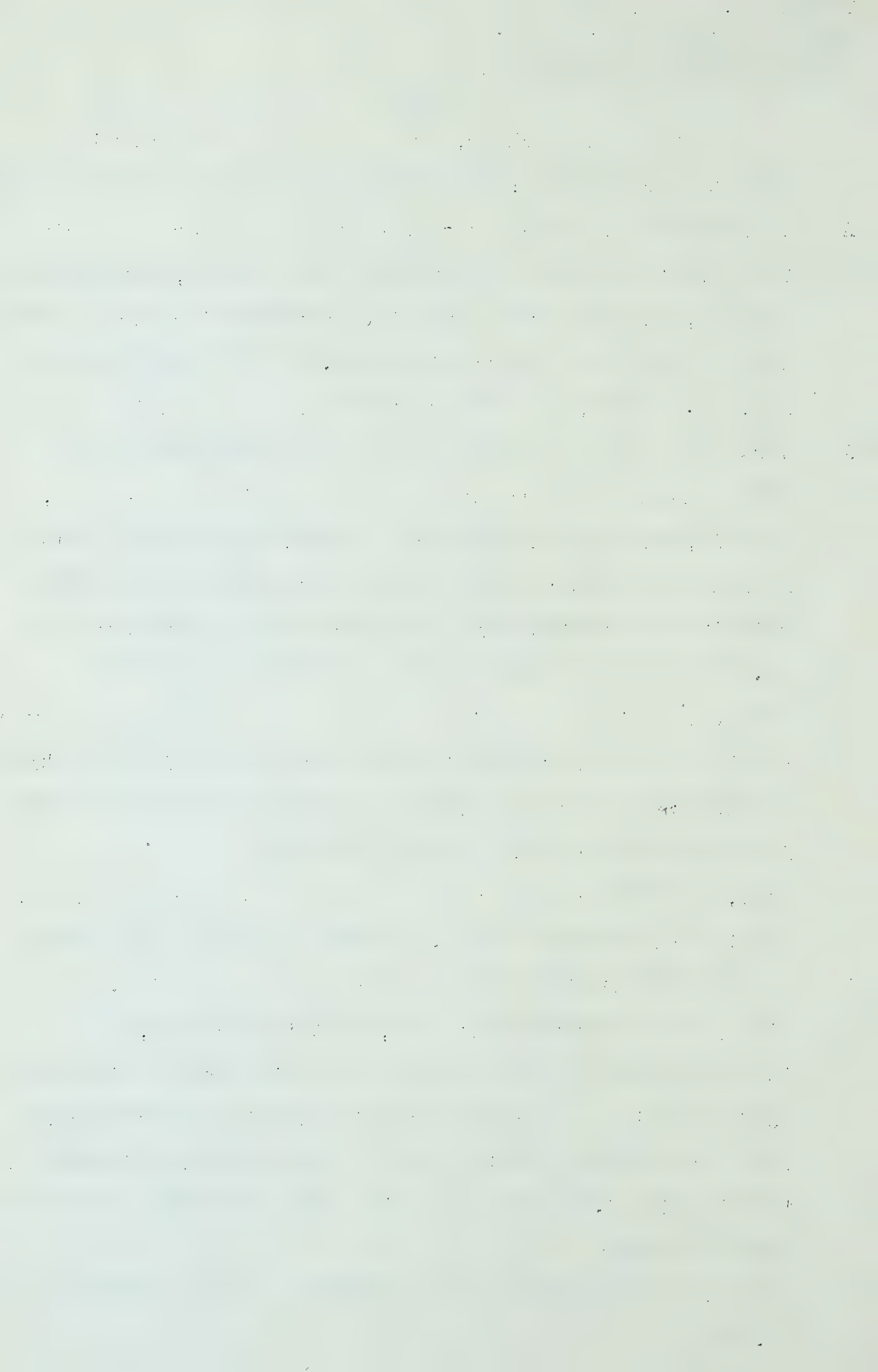
A I will agree with you if you will add the words "in domestic installations".

Q So you do not agree with the statement in the question I put to you?

A No.

Q Well in any case the report refers to two kinds of stokers, does it not?

A Oh yes.



Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5803 0

Q The one is an under-feed stoker?

A Yes.

Q Now that is a domestic stoker?

A That is right.

Q And the other is an over-feed stoker?

A That is right.

Q Is that a domestic stoker?

A Well it is in this case, yes. It is right on the title, right on the outside, the first page "Domestic Stokers", and it loses its point if you attach it to commercial and industrial.

Q I am just trying to find out from you what this report was supposed to be?

A Oh.....

Q Now would you agree with this, that the investigation of those two men was conducted to ascertain Alberta coal suitable for use in each type of stoker, these particular types of stoker?

A That is right.

Q And this Exhibit 136 is their report on their findings?

A That is right.

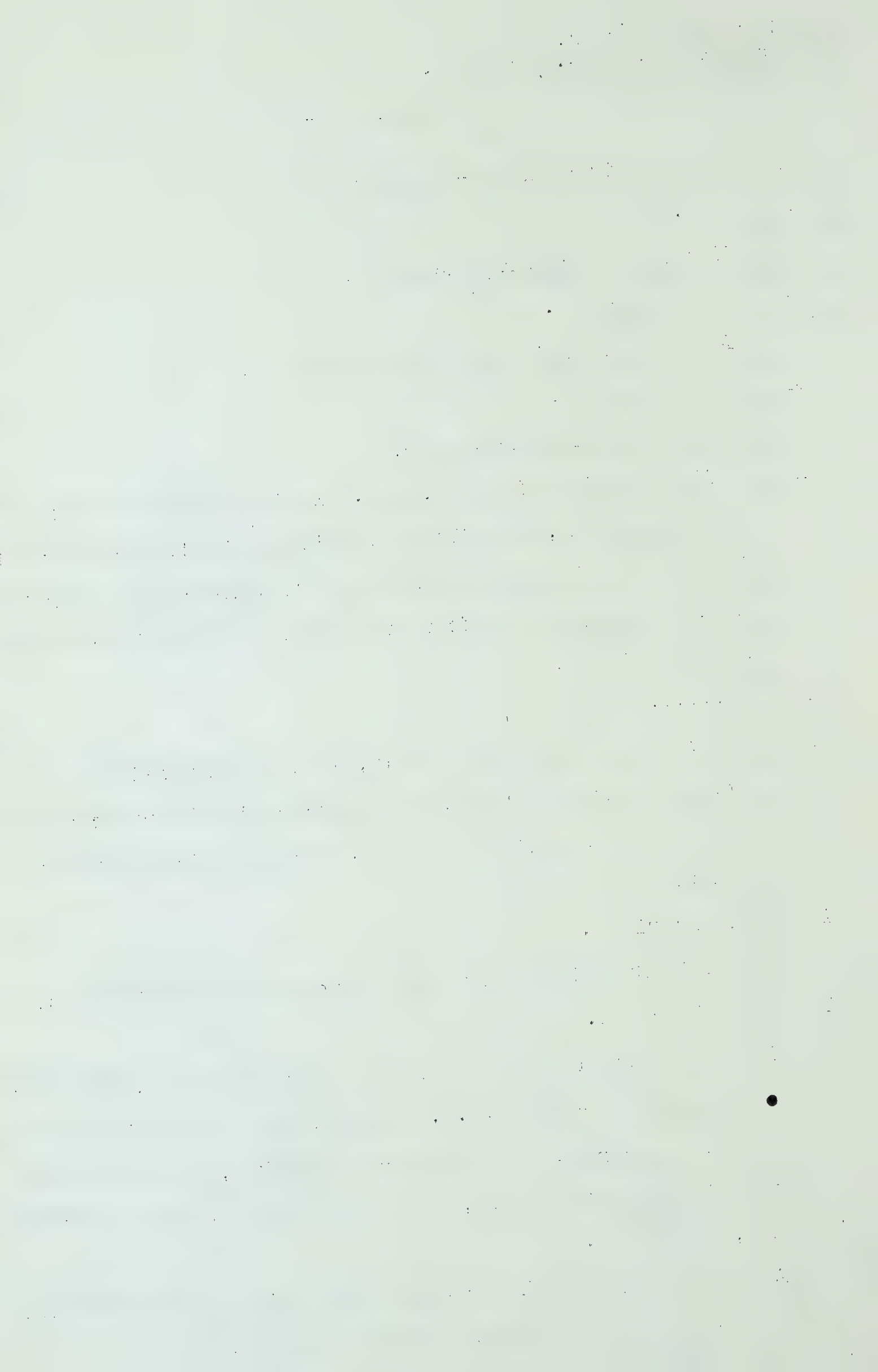
Q Now I suggest to you that in order for any coal, irrespective of the price or its B.T.U. content, to be suitable for use in either a underfeed or an over-feed stoker, it should have certain characteristics, would you agree with that proposition?

A Yes, I think so.

Q And I think you would probably agree with me that not all coals have those suitable characteristics?

A Oh, I agree.

Q And would you agree with this, that not all Alberta coals are suitable for use in either the over-feed stoker or the under-feed stoker?



C-3-11

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5804 -

A I would agree.

Q Now will you please turn to Page 10 of this Report. Exhibit 136, and I am referring particularly to the last, the third last paragraph, where it says this:

" The essentials for a coal for either an under-feed or over-feed stoker are combustion characteristics permitting the ready generation of the required heat in cold weather, and the maintenance of some fire in mild weather, without undue smoke or trouble with clinker or ash. The coal should be clean, free from dust, and suitably sized to suit the stoker in question."

You would agree with that proposition, I take it?

A Yes.

(Go to page 5805).

M-3-1 - 12.30 P.M.

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5805 -

Q And according to that a coal suitable for those stokers should have a combustion characteristic that promises the ready generation of heat in cold weather ?

A That is right, sir.

Q And the maintenance of some fire in mild weather ?

A That is correct.

Q And all that should be done let us say without undue smoke. That is desirable of course ?

A That is desirable.

Q And then it says it should be clean and free from dust ? It should also be suitably sized to suit the stoker in question.

Q Now not all coals as you have already told me are dust free and so on, but am I right in this, Mr. Davies, that both high and low rank ^{coal} /- as they refer to here - can be burned in automatic stokers if they have other characteristics that might make them suitable for stokers, is that right ?

A Yes. Coal can be treated with calcium chloride in regard to the dust. It is a question of cost. It all adds up to dollars and cents.

Q Am I right in this. In other words the B.t.u. content of the coal does not necessarily of itself determine the suitability for stoker use ?

A Oh no.

Q And as I understand it the heat value or the calorific value of the coal is of secondary importance when it is used near the mine, where it is produced, would that be right ?

A Oh yes, there would be transportation charges, yes sure.

Q But the heat or calorific value of coal in competition with another coal does become of greater moment as the shipping

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5806 -

distance from the mine is increased ?

A Yes we have a good example of that. Canmore vs Drumheller. One is \$1.38 and one is \$1.50. The Canmore is much higher in B.t.u. content than the Drumheller one.

Q Am I right in this, that coal which produces a large amount of smoke during combustion means that there is a considerable amount of heat value goes through the stack ?

A Right, Mr. Chambers.

Q Then just turning for a moment to coking coal. I notice there this report uses the term coking coal or the word coke. Am I right in this, that a coking coal is not in general suitable for a domestic coal ?

A That is right.

Q And as I understand also from the report that dusty coal is not suitable for household flues ?

A No, that is right.

Q And I think the report says these can be overcome to a certain extent by oiling the coal ?

A May I in answering that, you refer to the next one. There are a number of new coal appliances.

Q Just before we come to that for a minute, do you recall by reading this that is one of the -

A Yes, or by using calcium chloride on it.

Q All right, make your explanation.

A I am reading from Research in Coal Industry, Page 547, September issue 1945, Bulletin of the Canadian Mining and Metallurgical Institute. There is what is known as the down draft furnace which uses coal in domestic installations cost less than \$100.00. It is a magazine type runs coal for seventy-two hours, operates within the modern smoke ordinances

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5807 -

not exceeding two on the Ingelman chart, must be easy to handle and convenient, stands rough usage, is attractive in appearance. It burns coal two inches by one and one eighth. The hopper holds one hundred pounds. This is a new furnace under test by the University of Illinois. A fellow by the name of Professor J. R. Fellowes.

Q I do not want to interrupt you Mr. Davies, but I am wondering just what that has to do in response to my question about oiling the coal ?

A You were getting down to smoke in coal a while ago.

Q No, I put to you that dusty coal could be overcome by oiling the coal ?

A And calcium chloride if you want to develop it, but this is the answer to some of the problems you brought up with regard to something other than a specially designed furnace to use that type of coal.

Q Am I right in this that a coal with a low ash is most desirable for stoker use ?

A I did not understand that.

Q Well I am asking you.

A It is the type of ash whether it is clinkering or non-clinkering. I do not know that the quantity -

Q I am asking you for information as I understand it from this report that a high ash coal usually results in rapid accumulation of clinkerage and ash in the burners ?

A Page what ?

Q Page 11 I think it is.

A All right sir, I see the paragraph.

Q At the bottom of the page.

A That is right.

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5808 -

Q "A satisfactory clinker for the underfield stoker is one which is strong enough to allow removal with tongs".

Am I right in this a low ash coal is desirable for a stoker?

A Yes for household use.

Q For domestic stokers ?

A That is right.

Q And one of the reasons for that is as I understand it that high ash coal results in rapid accumulation of clinkers and ash in the furnace ?

A Right.

Q And they go on to say a good stoker coal should not produce an excessive amount of fly ash. Will you tell us what fly ash is ?

A A lot of dust, anything you stir up. It floats in the air.

Q Does it not also mean that by reason of fly ash you have to clean out your heating system periodically ?

A Yes, that is right. Chimney and flues have to be cleaned.

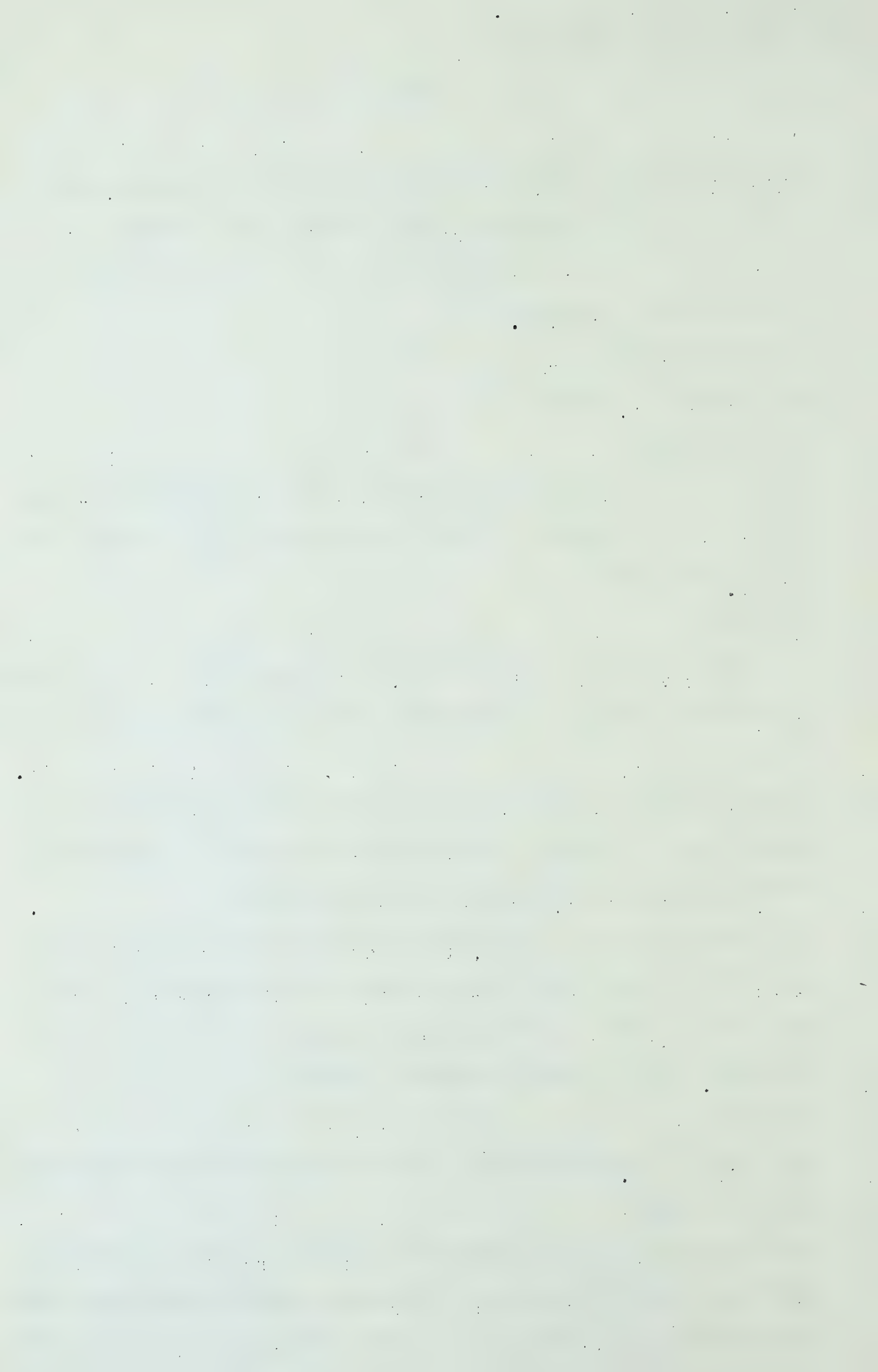
Q And then on that Page 12, they say as I understand it that coal should also be of proper size for the stoker and they are also talking about domestic stokers ?

A I agree.

Q And that is preferably one quarter to an inch and a quarter ?

A That is right.

Q Then I am asking you whether you agree to this proposition. That the degree of heating efficiency percent from coal used in a stoker would depend to a great extent on whether or not the ideal conditions we have listed or talked about are present as well as having coal with these proper characteristics. Would that be right ?



Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5809 -

A I think that is right.

Q And turning over to Page 21 where they talk about Group 2.
That is the Crows Nest area ?

A Yes, that is right.

Q Now I take it that those coals are not very suitable for
stokers, due to failure to clinker ?

A In domestic installations.

Q And that on Page 23 I gather that Drumheller coal is a
suitable, except clinker troubles ?

A Yes, but it could be used.

Q And then on Page 22, Lethbridge coal is of clinker type ?

A And again it can be used. I might say Mr. Chambers, that
there have been six different types of stokers invented by
the Bituminous Coal Association of America.

Q But Mr. Davies, you just follow me along on this question
and if any explanations are wanted we can deal with them
later and I suggest that your responses be in connection
with the question I ask you.

A Very well.

Q What I am putting to you is this, we are talking about domes-
tic apparatus that the crux of the matter would be not merely
the buying and installing of stoker equipment but really is
whether there would be a regular supply of satisfactory coal.
Would that be one thing ?

A That is one of them.

Q And -at reasonable or attractive prices, is that right ?

A That follows, yes.

Q And on Page 26 of the Report I think the men stress the fact
that if you are going to have the best satisfaction from the
use of these two stokers you must not only have a stoker but

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5810 -

you want the right kind of coal and you want a satisfactory supply of it. Would you agree with that ?

A I would agree.

Q Now then would you just turn to Page 7 at the bottom. I think it is the paragraph, the last sentence of the first paragraph, but I will ask you whether you agree with this or not.

"The final choice of installation in any case must frequently depend on the capital available, the price the household is willing to pay to save himself from work or inconvenience and the availability and relative prices of suitable coal, gas and oil fuels at the location in question."

A I agree.

Q You would agree with that proposition ?

A I do.

Q Now I would like to refer you just for a moment to this Petroleum Engineering publication of January 1946, on Page 160, and I notice here a table No. 2, It gives the annual consumption of natural gas in the United States in 1935 to 1944 inclusive. You will observe, Mr. Davies, that it breaks it down into industrial, domestic and commercial. Would you just read that for the purposes of the record, the industrial consumption in 1935.

A 674,213.

Q And then for the year 1944 it was what ?

A 1,898,143.

Q And that table without giving all the figures shows a progressive increase ?

A That is right.

Q And the domestic and commercial in 1935 was ?

A 413,685 and in 1944 810,182. These are given in millions of

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5811 -

cubic feet.

Q And I observe here, Mr. Davies, and will you check me, I was wondering in this industrial whether it was fuel for other purposes. It says here:.

"Industrial use also includes the small amounts of gas that enters chemical operations. No satisfactory information exists regarding the exact amount of gas entering the chemical field but, from available figures on the total production of organic chemicals,^{it} can be concluded that the amounts so used are trivial in the terms of total gas demand."

A Yes sir.

Q The reason I put that to you Mr. Davies was that even with these new improvements for the use of coal, particularly in industrial plants that the consumption of gas in the United States as shown by those figures has increased by tremendously large percentages as compared with the percentage of increase of domestic. Now what would you say as to that?

A I think that is true. That happens to be a very excellent article and it gives you this consumption on these new plants, the Fischer-Tropsch plan of the amount of heat units they get out of it. It is well worth reading.

Q THE CHAIRMAN: And the price of gas, does it give it going up or stationary?

A If it goes up it brings in this coal business that we mentioned and read into the record. If it is used for making gasoline it gives you the relative price to where it can go to make gasoline, and he gives prices in there on American coals and conditions and whether he thinks it can be utilized to make gasoline. That is a recent article and

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5812 -

it is a good one. Yes, Mr. Chambers, does that answer the question ?

MR. CHAMBERS: Yes, and I think Mr. Davies you told us you have resided here for a good many years ?

A It would be a long time.

Q Back in 1912 ?

A I came here in 1911.

Q And you have as I understand it acted as Advisory Engineer to the City of Calgary in this natural gas matter since 1921 ?
A 1926. I first appeared in the hearing in 1926.

Q Now Mr. Davies, I am going to put to you this question. Do you as an Engineer who has closely kept in touch with the situation give it as your sworn opinion to this Board that the present retail gas load in Calgary is on the verge of, whether it is likely to be appreciably decreased by any increase in the retail price of gas ?

A Do you mean domestic ?

Q The question I suggests covers both phases ?

A Well I will answer it in subdivisions. An increase in the price of domestic gas will bring lower amounts consumed per customer. An increase in commercial rates will bring closer to the point where coal is a cheaper fuel and costs in commercial installations is the first consideration. An increase in industrial rates-the same answer applies as in commercial.

Q I am going to suggest this to you, Mr. Davies, to see what your view is that the domestic rate in Calgary is out of line with the commercial and the industrial rates and I mean by that it is lower proportionately than it should be on the basis of allocating costs of the utility ?

Related to 1911
1911

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5813 -

A Sir, I have been on these -

Q Do you agree with that or do you not ?

A Oh I partly agree with it and partly I do not you see.

Q Well I would like you to tell me why you do not agree with it fully, or some qualification or reservation ?

A If you start to figure out on a demand basis the cost will vary somewhat today but I think \$19.00 per customer was found to be the fixed charge that we required in 1939. Then when you come to your commodity charge every building in Calgary utilizes a peak load the same as domestic consumers and I do not think that there is anything out of line at all between the domestic load and the commercial buildings because they burn virtually nothing in the summer time and just as big a peak load is one of the problems, is one of these commercial buildings which draw very heavily on a cold morning. Therefore it is not out of line when it comes to cost.

Q What about industrial ?

A When it comes to industrials I think it was out of line up to the year 1935 when we put in No. 6 rate. When we put in No. 6 rate it was put in on the advice that I advised it could be accepted on the sole reason of bringing the industrial rate low enough to provide first of all we would not lose to coal, secondly it would be brought into line.

Q Is not No. 6 rate available to industrials with large consumption ?

A It is available to anybody that has a demand factor. The Calgary City Hospital - it has a demand factor rate.

Q What I am putting to you is, Mr. Davies, that that rate No. 6 is not of interest or concern to the larger part of the industrial consumers in Calgary. What do you say as to that ?

A I do not agree. I have the figures here.

T-4-1 - 12.55 P.M.

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5814 -

Q All right.

A Now I read in the record today the industrial consumption for the year 1944 and I am going to read you now the industrial consumption for under Rate 6, excluding the refinery as it was excluded in the other years. For the year 1943 - so they are not just exactly comparable but it will give you an idea.

Q Rate 6 was not in force in 1944 was it ?

A Rate 6 came into effect, not in 1944, no, it came into effect the 26th of January 1945. So those two years, I am reading from 1943 and the figures that we were considering this morning were 1944 industrial figures. So with that there was 1.39 billion eligible to be sold under Rate 6 in 1943.

Q And included in that is the Imperial Refinery ?

A Excluding.

Q Excluded ?

A The total with the Imperial Refinery is 3.28 billions.

Q Of these others - -

A The great big part of the industrial load Mr. Chambers is under Rate 6 and being as I am working on that a good deal I tell you now that a great proportion, probably 80% - -

Q Is billed under Rate 6 ?

A It comes in under Rate 6.

Q Now then I observe from Exhibit 134, Mr. Davies, which were these historical rates ?

A Right sir.

Q That the rates imposed after the Rate Hearing in 1939 were 33 cents net for the first 150 M.c.f. ?

A You said 1939, you mean 1931 ?

Q No. 1939 ?

A That was just a conference. There was not any Rate Hearing.

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5815 -

That was a negotiated rate schedule.

Q Yes, well all right.

A And there is a lot of work in it.

Q These rates were in force until November 1943 ?

A That is right.

Q And under that new domestic combination rate which came in in 1939 ?

A Yes.

Q The domestic was 27 cents net, that was the popular rate ?

A Yes.

Q Then there was the combination commercial industrial comparable with 24 cents ?

A Yes, that is right.

Q As I understand it prior to 1939 and from 1938 down to 1939 there was only one uniform rate and that was that 33 cent rate, is that not right ?

A Yes. And as you went down, you went down to 15 cents for bulk.

Q Yes, that is right ?

A Yes.

THE CHAIRMAN: I think we will adjourn now, Mr. Chambers.

MR. CHAMBERS: For a matter of convenience Mr. Stevens-Guille would like to know whether you intend to sit on the week of the 18th or not ?

THE CHAIRMAN: I understand that the Court of Appeal has fixed your appeal, Mr. Steer, for Thursday and Friday, so if there is business we can do here we can sit on the week of the 18th. Is that right ?

MR. STEER: Very good, sir, yes.

Stanley J. Davies,
Cross-Exam. by Mr. Chambers.

- 5816 -

MR. CHAMBERS: And next week ?

THE CHAIRMAN: If you do not want to sit all three days and you wanted one day before you came into the Appeal Court that could be arranged.

MR. STEER: I am sure Mr. Fenerty will want one, he is the appellant.

MR. FENERTY: I will probably need a few minutes.

MR. CHAMBERS: I communicated with other Counsel engaged and they were all very kind to say that Tuesday, Wednesday and Thursday of next week would suit them if that is agreeable to you.

THE CHAIRMAN: I think possibly I want a meeting with all of you tomorrow to discuss where we are going and how soon we are going to get there.

MR. McDONALD: Could we have that in the morning, sir ?
I want to go to Edmonton in the afternoon.

THE CHAIRMAN: On the plane ?

MR. McDONALD: Yes.

THE CHAIRMAN: That goes at 1.15.

MR. McDONALD: 1.20.

THE CHAIRMAN: I have faint hopes of getting that one myself.

(At this stage the Hearing was adjourned until 9.30 A.M.
5th March, 1946.)

